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The OIL WEEKLY

OIL and GAS ENGINEERING

FOR OIL AND GAS PRODUCTION AND PIPE LINE DIVISIONS

THE WEEK'S NEWS INTERPRETED

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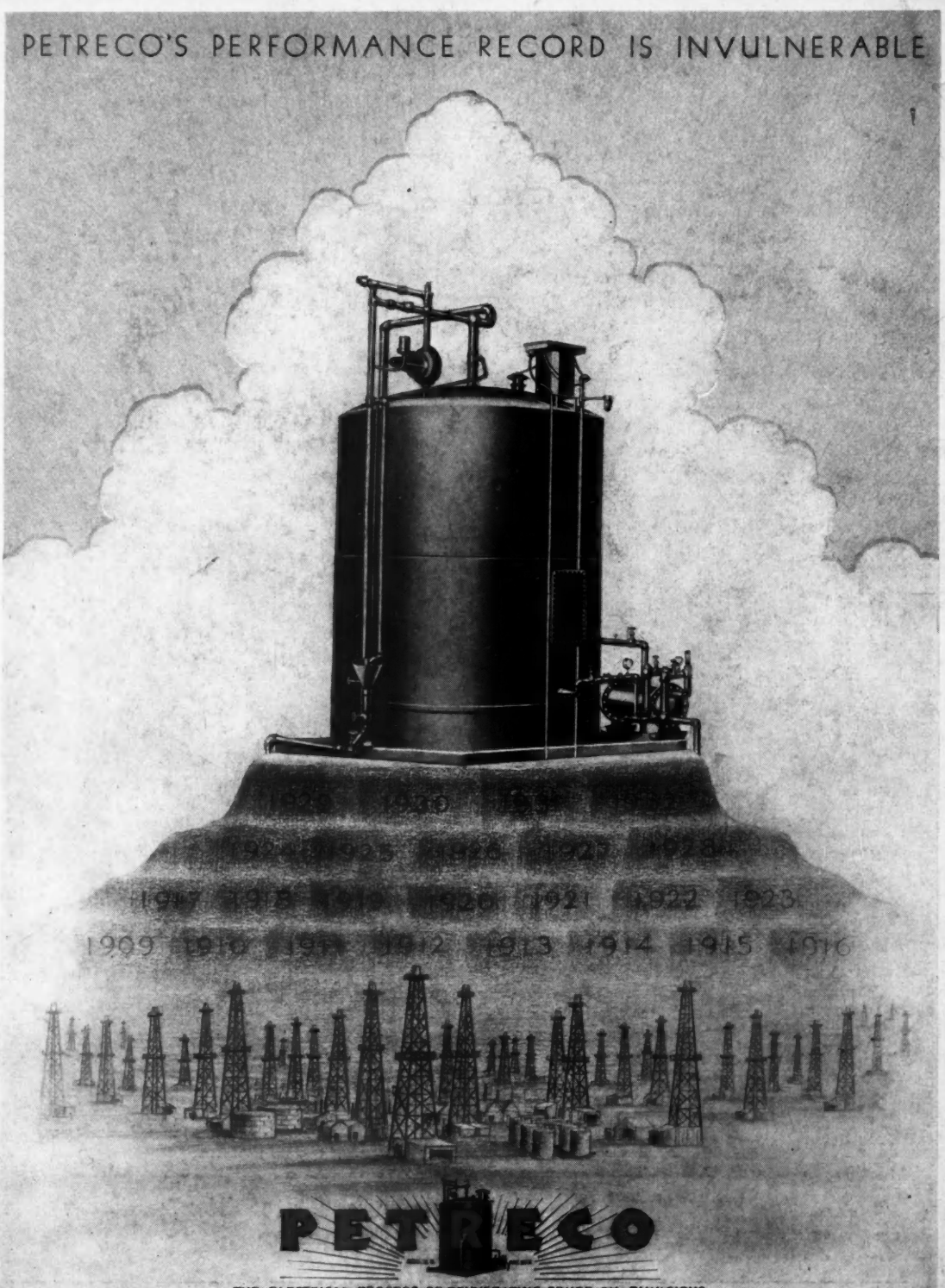

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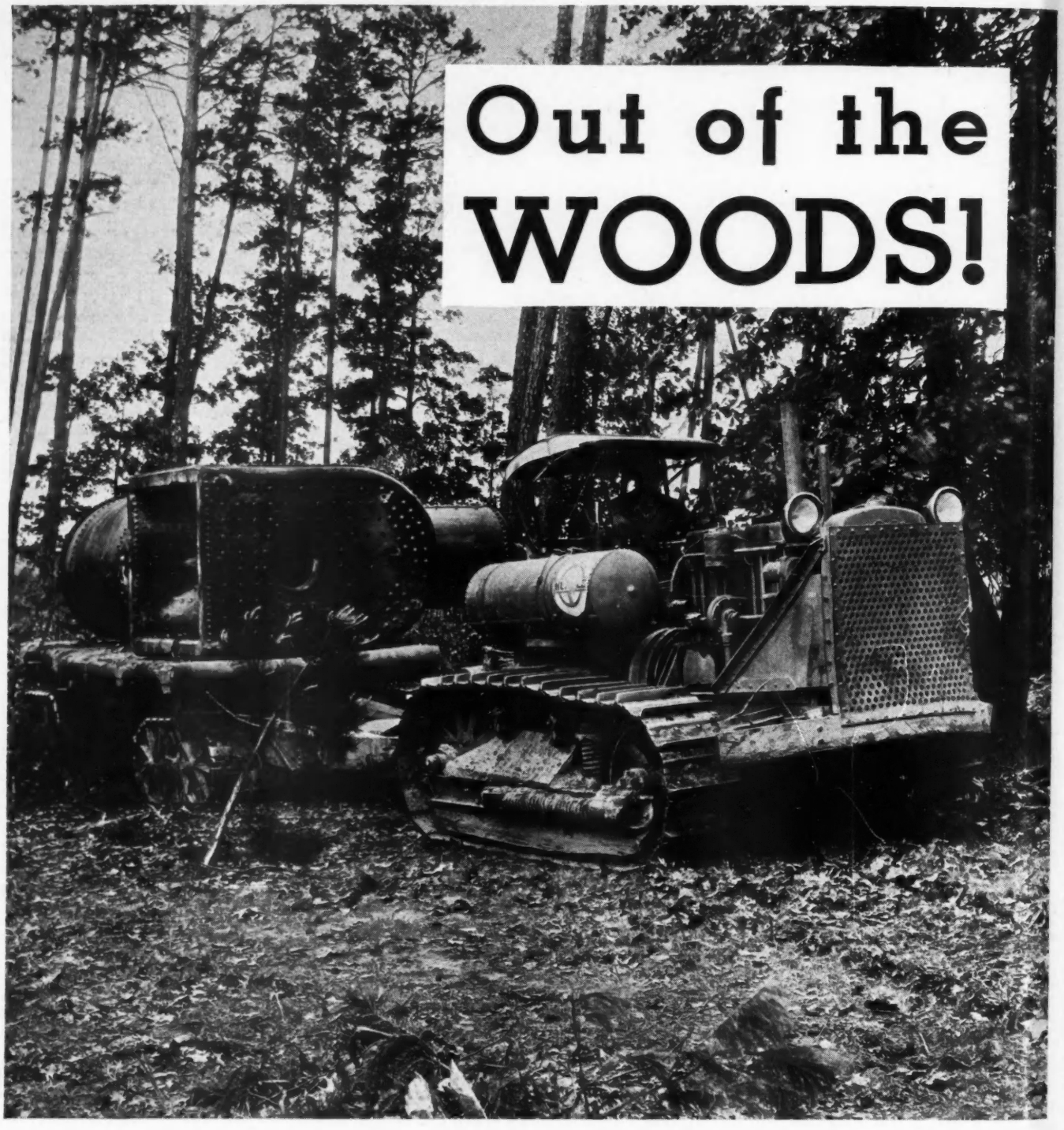

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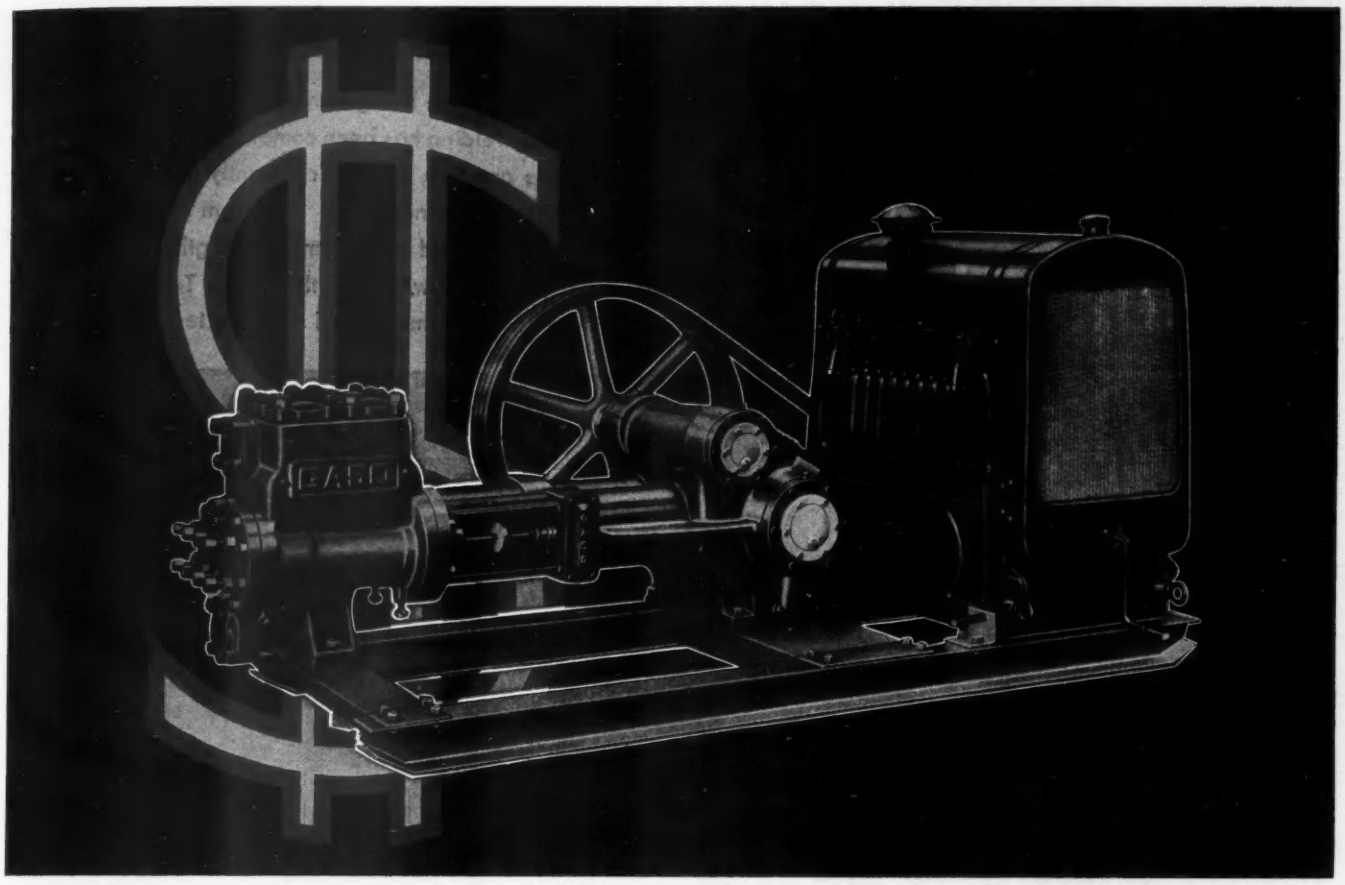

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VOLUME 67, No. 3 OCTOBER 3, 1932

THE OIL WEEKLY

FOR OIL AND GAS PRODUCTION AND
PIPE LINE DIVISIONS

ENGINEERING • NEWS • STATISTICS

The Changing Panorama

How water moves in underground strata is of particular interest to the industry at this time because of its relation to problems of equity under proration, notably in East Texas. How this movement progresses has perhaps had most study in the Bradford field of Pennsylvania where artificial flooding and control of such flow by location of wells has become a distinct factor in oil recovery. Mr. Nowels' discussion of the mechanics of water movement, on the other hand, would be interesting regardless of timeliness. Page 29

"It's An Ill Wind—"

"They" have been threatening to cut the price of crude. Who "they" are has been only indefinitely established, as it appears that the rumors eminating from them are hardly by remote control. Only names mentioned are Standard of Indiana and Humble, and then by Governor Murray. Statements from time to time from those companies in a regular way have been that prices will go down if production goes too high, and that production has been and is too high—all agreed to by statisticians as well as the average oil producer. One trouble is that all producers are agreed that production should be cut but too many groups and individuals want the other fellow to do the cutting. The situation in East Texas is typical and Oklahoma City is an example. These fields came in late and now want all others cut back to let them produce. And on top of all that there appear to be plenty of producers willing to admit that the price is too high. And then there is the old saying about the ill wind. Amos Beaty who threatened dire destruction a few weeks ago is out with a statement that the lowering of gasoline prices was only to adjust stocks; officials in Oklahoma, Kansas and Texas are moving for relief of the situation according to their several methods and their usual relative verbosity; and even Carl Estes has had a change of heart and would rather see East Texas with more cash even if its rights to production must be curtailed.

Equitable Proration

What method of production will insure all parts of an oil "pool" retaining relative conditions throughout the production period? One who can answer that to the satisfaction of owners of acreage will have done a real service to the cause of conservation and rational development. E. H. Griswold in his paper before the A. I. M. E. at Ponca City, offers a method which he admits is subject to criticism but more practical than present practice in prorating fields. Page 23

The Oil Man's Calendar

OCTOBER

3-7 *National Safety Council, Washington, D. C.*

4-6 *Society of Automotive Engineers, Transportation Meeting, Toronto, Canada.*

10-14 *Annual Convention, American Gas Association, Atlantic City, N. J.*

11-12 *Kentucky Petroleum Marketers Association, Louisville, Kentucky.*

15 *American Chemical Society, Oklahoma Section, Tulsa, Oklahoma.*

25-27 *Four State Convention, Kansas City, Missouri.*

NOVEMBER

10 *California Natural Gas Association, Los Angeles, California.*

15-17 *Thirteenth Annual Meeting, American Petroleum Institute, Houston, Texas, Rice Hotel.*

DECEMBER

5-9 *American Society of Mechanical Engineers, New York, N. Y.*

6-8 *Nebraska Petroleum Marketers, Omaha, Nebraska.*

? *Rocky Mountain Oil and Gas Association, Great Falls, Montana, Rainbow Hotel.*

What Will Happen *Should Wells Be Opened* In East Texas?

R. L. DUDLEY

WITH the possibility that the three-judge federal court in Houston might, in its decision yet to be announced, open up the East Texas oil field to an unrestricted flow operators throughout the world are finding a keen interest in speculating as to what would happen should East Texas "go wild". That there is a possibility of a decision adverse to the Texas Railroad Commission in its proration orders on East Texas is granted by most of the people who have studied it although some attorneys who followed the case hold a different opinion.

Opinion generally seems to be divided into several camps on the matter of what would happen if restriction on production were taken off of East Texas.

Following are these opinions as developed by THE OIL WEEKLY:

1. One group has the opinion that if restrictions are removed and the wells begin to open up it will result in drastic reductions in price, chaos in the field and the removal of most of the oil that could be produced. Trunk pipe line capacity in the East Texas field could within 30 days move between 750,000 and 800,000 barrels of oil. Railroads at the peak of the 1931 over-production in East Texas moved 275,000 barrels. Refineries in and adjacent to the field have a total capacity of around 85,000 barrels but it is not likely that more than 60,000 barrels a day of this would be running constantly, making a total of around 1,100,000 barrels a day for which facilities are at present provided. It is conceivable that these facilities could be stretched to as much as one million and a quarter barrels a day.

If the price of oil should go to 10 or 15 cents, this group argues that around 1,000,000 to 1,250,000 barrels a day would be moved out of East Texas. This would result in ruin to many operators among whom would be some of those who opposed proration. Such a situation would affect the price throughout the Mid-Continent and would result in drastic reductions in production elsewhere.

Stocks

This group argues that, taking into consideration the fact that crude oil stocks east of the Rockies have shown a decline of around 8,000,000 barrels from January 1 to August 1 and a decline of around 50,000,000 barrels from December 1930 (when the East Texas field was discovered) to August 1, 1932, even if the field is opened up and allowed to produce a million barrels a day it will not likely be able to continue this flow for more than 90 days, with the result that the industry will see the menace of East Texas out of the way without our having added actually to the stocks on hand when East Texas was discovered. They point out that imports are now down around 200,000 barrels a day as compared with a year ago and that this will begin to have some effect on the American market structure.

This group further points out that when the head is off in East Texas and East Texas wells must be pumped with a coincident water problem—that the market should immediately begin to get stronger. They point out a fact, known to the oil industry generally, that aside from East Texas there is no threat on the oil horizon and that the oil industry has under-discovered rather than over-discovered during 1931 and thus far in 1932. This is the silver lining they offer in compensation for the very dark picture if the field should be opened wide.

2. Still another group argues that the federal court must have the belief that the unrestricted flow of oil in East Texas would most certainly produce waste. They argue that neither side in the recent hearings denied this but that the complainants did say that the proration regulations of the railroad commission were inequitable and unreasonable. This group argues that the federal court may fix a new method of proration in East Texas which would probably allow more oil to be produced but under somewhat different orders and principles than is the case at present.

What People Would Do

3. Still another group argues that the temper of the people in East Texas is such that if the court should allow unrestricted flow the land owners and some of the operators in East Texas will take the matter into their own hands as was threatened just before martial law was declared. This group cites that the temper of the people is illustrated in public meetings and private conversations and say that the people in East Texas will rise up and refuse to allow their natural resources with consequent economic laws to be dissipated.

4. There is a fourth group which points out with a fair sufficiency of evidence that even if East Texas were opened up to an unrestricted flow, this would not mean actually that the field would long flow wide open.

"In the case of our own company," said the president of a large pipe line company operating in East Texas, "while we might be able to operate to capacity for a week's time at the end of that time we would have to shut down because we would not have anywhere to put the oil.

"Even if the ridiculously low price of oil in East Texas should make it extremely attractive to buyers it would be considerable time before fields in other sections would be shut down, and where would the oil be stored?"

He further stated that if a million barrels a day were taken from East Texas beginning tomorrow that he doubted if such a taking could continue for more than two weeks without a halt being called through lack of buyers or lack of storage.

When asked about the possibility of steel storage being erected to take care of 10-cent and 15-cent oil he said that it would be very difficult for the country to build a half-million barrels of storage at the point at which it

would be located even with a full month's notice.

Finally this man, and there are a number of other men who think as he does, believes that some sort of voluntary proration might be agreed upon by the majority of property owners and operators until the Texas legislature can meet in January and "pass a new law."

That any new law which might be passed will seek to take the economic situation into consideration seems apparent. Whether or not such a law can be passed in Texas under the Texas constitution is a point disputed by many.

There may be variations of the four general opinions expressed but the four mentioned above seem pretty well to cover the ideas of different operators as to what "could happen."

The irony of the thing is that the first job which the oil industry would have to do after East Texas had eliminated itself by committing an economic crime, would be to start anew the search for new reserves that we know we are going to need!

East Texas Price Cut *Protest Meeting* Strengthens Proration

Tyler, Texas. — A protest meeting against an anticipated general slash in crude prices staged here on the night of September 27 has had a favorable influence generally in arousing interest of producers in the importance of restricting production to seasonal demand as an alternative to an adjustment of crude prices. The meeting was sponsored by Carl Estes, Tyler newspaper editor who has frequently in the past voiced opposition against proration and production allowables in the East Texas oil field. In addition to a large turn out of East Texas producers and royalty owners with a few representatives of major companies present, the meeting was attended in person or by representatives of the conservation departments of Kansas, Oklahoma and Texas. A radio address was given from Oklahoma City by Governor W. H. Murray of Oklahoma.

The Tyler meeting was staged primarily to spread the alarm that a sharp drop in crude prices had been decided upon by an unnamed major company, and by prematurely exposing the company's plans it was hoped that publicity would forestall the cut. The publicity was accomplished by extending personal invitations to the editors of a number of leading dailies in Texas and Oklahoma, while two hours of the speaking program was broadcast over radio by remote control from a Shreveport station. This radio arrangement enabled oil men interested in the proceedings, but fearful of becoming involved in price fixing charges, to listen in without attending.

Scathing remarks were directed by the speakers on the program toward the company, or companies reputed to have reached a decision on inaugurating a period of lower crude prices throughout the Southwest. Each of the speakers refrained from calling names, but stated that rumors of an impending price cut had reached them from reliable sources.

Charges were frequently made that some of the major companies that have heretofore fostered proration generally are now ready to discard such restrictions in order that empty storage may be filled at low prices. Remarks of this nature created sentiment favoring tighter restrictions on proration and immediate reduction of the proration allowance of the East Texas and other important fields in the state.

The three members of the Texas Railroad Commission were present, and evidently were impressed by this outspoken sentiment favoring a lower allowable for the state as the body issued a call for a state-wide proration hearing before departing from Tyler the following morning. However, a petition requesting a new hearing on charges of physical waste taking place in the East Texas field while the 375,000 barrel daily top allowable prevails was drafted and signed prior to the Tyler meeting by the directors of the Texas Oil & Gas Conservation Association during a special session at Dallas. In calling the general hearing the commission has the support of two factions that have often been divided in their views on proration matters.

A resolution offering opposition to a price cut, and proposal that production be lowered contingent upon a proportionate increase in the price was ap-

Move to Cut Production *in Texas 100,000 Barrels to* Uphold Price

Fort Worth, Texas.—All oil producing areas in Texas are to be asked to contribute a portion of their current allowable production in bringing about a substantial reduction in the output of the state when a state-wide hearing is held by the Texas Railroad Commission at Austin on the morning of October 8. In order to expedite matters the Texas Oil & Gas Conservation Association has appointed committees consisting of leading producers and royalty owners in each of the six districts to collect data pertaining to known instances involving waste, and also to obtain voluntary co-operation of producers in their respective districts in restricting production on a uniform basis.

Prompt action in curbing the total output of the state by more than 100,000 barrels daily is expected to forestall the rumored slash in crude prices, and preclude the necessity of adding to above-ground storage during the winter months on a large scale. The directors of the association initiated the movement to have the commission hold a hearing at a special session held in Dallas September 27, and a similar request was made to members of the commission at a meeting of operators in Tyler later the same day.

Chas. F. Roeser, president of the Texas Oil & Gas Conservation Association, has announced that the chairman of each district committee assigned to assist in eliminating physical waste and lower the production of all fields will also be a member of a state-wide body. This group will then function in an advisory capacity when the revised allowable of all fields is fixed.

Voluntary acceptance of a reduction in production by producers in areas exempt from physical waste will be necessary to reach the goal set for the state on production during the winter months. The special committees appointed for each district will be responsible for converting the producers to the program as an alternative to a price cut.

Austin, Texas.—Effective seven a. m. October 1, the Texas Railroad Commission has ordered a maximum per well allowable of 44 barrels per day in the East Texas field. The commission estimates that 8400 wells, producing at 44 barrels per day, will be necessary to hold the field to the allowed 375,000 barrels per day.

proved without opposition by the Tyler meeting.

Serving as chairman of the meeting, Estes stated that he was originally opposed to proration, but had been converted into believing that regulation was the best for all interests. He warned that certain companies were seeking to take down the barriers on production, and suggested that these undesignated forces be given a real dose of proration by lowering the allowable of the East Texas and other fields.

Major J. R. Parten, Shreveport, president of the Independent Petroleum Association of Texas, predicted that illicit oil movement from the East Texas field would greatly increase should a rumored price cut materialize. He asked that immediate steps be taken to ward off a break in crude prices and that proration be strengthened.

Preference for a downward adjustment of production as a means of preventing a collapse of the price structure was voiced by Wm. N. Davis, vice-president of Phillips Petroleum Company and president of the Mid-Continent Oil & Gas Association.

Marvin Lee, chairman of the advisory committee of the Kansas Public Service Commission and president of the Kansas division of the Independent Petroleum Association, advocated reduction of production to an equal basis with current demand, and also to restrict excessive refinery runs and unnecessary drilling as a means of stabilizing the industry.

Russell B. Brown, executive manager of the Independent Petroleum Association of America, stated that there is no economic grounds for the great purchasing companies to lower the price structure on crude at this time. He accused companies that unsuccessfully opposed the efforts of independent producers to obtain a petroleum import tariff of trying to destroy the benefits derived from this protective measure by threatening a price cut.

Governor Murray reviewed the history of his military shutdown of the larger fields in Oklahoma, and how his action led to a return of crude prices to a fair level. He stated that it was largely through his efforts that the governors of Texas and Kansas caused their respective states to effectively curb troublesome fields. Governor Murray suggested that publicity be used extensively to checkmate the threatened break in prices, and to go the limit in seeing that the larger companies do not wreck the oil business again.

Talks were made by the members of the Texas Railroad Commission, Tom E. Cranfill, Dallas, former president of the Independent Petroleum Association of Texas. Gus Taylor, president of the East Texas Chamber of Commerce; J. C. Denton, Mid-Continent Petroleum Corporation, Tulsa; Eugene Lorton, publisher of the Tulsa World; and Carl Magee, editor Oklahoma City News.

Due to an oversight, or preference to avoid the subject, the speakers refrained from commenting on the repeated attempts being waged by a group of independent producers and brokers of crude to have the commission's proration authority in the East Texas oil field thrown into discard through attacks in federal court. A case involving seven suits against the proration issue was tried at Houston beginning September 19, and the future of proration enforcement in the field rests with the decision to be made by the three judges that tried the case. The verdict probably will not be made public for several weeks.

Production Reduction *Would Terminate* Humble Storage Plan

Fort Worth, Texas.—An abrupt termination of its part payment and storage plan is expected to be announced shortly by officials of Humble Oil & Refining Company as result of the favorable prospects of a substantial curtailment of production in the East Texas field and other districts within the State when a general proration hearing is held by the Commission October 8. Another factor behind the return of the company to the full payment of all oil produced and purchased is the failure of others to follow suit.

The policy of Humble Oil & Refining Company in settling for only 60 per cent of the royalty oil produced from its own wells and for outside purchases, with the remainder going to storage for the account of the owner at two cents monthly rental per barrel is largely responsible for the widespread rumors that a slash in crude prices may occur momentarily. This company is the largest purchaser of crude in Texas, and its present abbreviated buying plan was applied effective September 16 in East Texas, Texas Panhandle and the Wichita Falls-Ranger districts. However, three counties were excluded in the Ranger district. In spite of its apparent leadership in Texas other purchasers have elected to maintain their takings and purchases at a normal level and watch developments. However, these companies will not adhere to their full-payment policy should it become evident that the largest buyer is accepting appreciable quantities of oil to be bought in later at much lower prices.

Restoration of confidence in the price situation in the Southwest will be greatly improved when Humble Oil & Refining Company resumes a normal buying program. It is understood that when the accumulated storage oil is bought in that storage charges will be disregarded. Only a small percentage of the affected royalty owners and outside well connections have signed the revised division order made necessary by the inauguration of the part payment-storage plan.

Commission Will Consider Waste of Oil in Storage

Austin, Texas. — Announcement by the Texas Railroad Commission of a statewide proration hearing to be held in Austin on September 8, came as a complete surprise to observers here, as hearings have been held on every field in the state and orders have either been issued or are in process of preparation to control production in every area not covered by the marginal well law.

Commissioner Earnest O. Thompson stated that the commission has called this hearing to consider waste that is certain to result if more oil is produced than can be absorbed. He insisted that this oil should be kept in the natural reservoirs where there is no physical waste through evaporation which is certain to take place if oil is stored above ground. He repeated that many witnesses have testified in hearings before the commission that oil in storage on the surface evaporates at the rate of four or five per cent per annum, and declared that it was the duty of the commission to prevent this waste if possible.

Commissioner Lon A. Smith stated that reports had come in from several fields that production was still too high, and that the commission was determined to obtain the most efficient operation possible in every field in the state.

Although the commission may not consider price in the course of its hearing and in fixing proration allowables over the state, this action should do much to bolster a shaky market.

Austin, Texas. — Assistant Attorney General Fred Upchurch left for Washington Saturday to attend the trial of the McMillan case which is set before the United States Supreme Court on Monday, October 3.

Stuck Master Gate *Defies* *Oklahoma* Military Order

Oklahoma City.—Oklahoma's proration battle was renewed with increased vigor during the week when the Oklahoma Corporation Commission announced decision in the cases of three companies charged with illegal production from the Oklahoma City pool and the state supreme court was hearing arguments on a petition to remove its supersedeas bond which would have granted Wilcox Oil & Gas Company the privilege of reopening 10 wells shut in under martial law had not military authorities ignored the court order. Attorneys for the corporation commission are arguing that the $5000 bond should be revoked but that if any is granted it should be in an amount not less than $500,000. Following the clash between national guardsmen and employees of Wilcox Oil & Gas Company proration attorneys started action against the bond which they claim in effect licenses illegal production of oil. As one attorney put it, "Any producer, having overproduced his wells more than 1,000,000 barrels, would gladly post a mere $5000 bond so as to continue such production, while other operators, abiding by the statutes and proration rules of ratable taking, must sit idly by and see their lands drained. To put it bluntly, the court is permitting the company to supersede the plain provisions of the law."

Marshall Oil Company, acting under privileges granted by the supersedeas bond and in opposition to military forces, is said to have opened its Butcher 1 early Monday morning, September 26. National guardsmen discovered the well on production shortly after it was opened but could not close the master gates and it has been producing since that time. Troops acting under Colonel Cicero Murray allege that they dug up a secret line the following day and were making plans to close the well in.

A second important phase of the proration fight is the petition of Champlin Refining Company which suggests that new potentials be taken in all state pools and that such potentials be taken on regular production with no unfair accumulation of "heads," and that all gauging be done with all of the wells in one half section or quarter section producing at the same time. It is further suggested that potentials be supervised by some state agency and by persons in no way interested, if necessary by the state militia. The petition points out that the Seminole area is served by some lines which do not serve the Oklahoma City pool and that certain other lines serve both areas. Under the Champlin plan nominations would be made so that those lines serving only the Seminole district would be required to increase their takings in the Seminole area and those serving both Seminole and Oklahoma City would be required to lessen their nominations in the former area and increase in the latter. It is claimed that upon elimination of alleged discrimination and under new potentials there should be an allowable production in all Oklahoma fields of not less than 15 per cent of the potential or a greater amount if it is determined that Oklahoma under such allowables would be denied its fair proportion of the market as against other oil producing states measured by comparative potentials in one state against another. Alleging enormous waste of gas and gas energy in the Oklahoma City pool, Champlin asks that all of the wells in the different state pools producing over 25 barrels per day be prorated alike and production allowed upon a percentage of the new potentials and regardless of water encroachment.

One of the outstanding developments of the week in proration violation hearings was the assessment of a fine totaling $14,200 against Oils Incorporated for overproducing Ross 1. The well is alleged to have produced 709,000 barrels during the period March 13 to August 5, 1931, no production reports having been made either to the corporation commission or the field umpire. The fine was fixed at $200 per day instead of the maximum of $500 per day which may be assessed. Each day constitutes a separate offense. Owners of the well have been denied the privilege of taking new potential or of making up underage claimed on the basis of the initial potential which rated it close to 100,000 barrels on a 24-hour calculation.

Murray Says Price Cut Will Shut Down Seminole *Field*

Oklahoma City.—Dollar oil or no oil at all was in effect Governor William H. Murray's ultimatum to Mid-Continent purchasers said to be behind a move to reduce the price of oil in Kansas and Oklahoma. "The ones said to be behind the move to demoralize the crude oil market have great holdings in the Seminole field," said the governor. "If they start that movement it will be easy enough to shut down the Seminole field and let them take the fall of the temple from which they have pulled the pillars. They might as well get it in their minds that they are going to pay a living price for the crude, not an exorbitant one; I would not join in an exorbitant price, and one dollar oil is but a living price and must be maintained."

Governor Murray's statement came Monday afternoon, September 27, the day preceding the meeting of oil men in Tyler, Texas, where the subject of impending price cuts was to be discussed. Widespread rumors that two major purchasers had agreed to reduce the price of oil aroused the Mid-Continent fraternity into immediate action with meetings held in Tulsa, Oklahoma City, Wichita, Fort Worth and Tyler. Thurman Hill, member of the Public Service Commission and leader of Kansas in an attempt to secure stabilization in the industry, stated while in Tulsa that Kansas will use every resource at its command to avert a break in the present price schedule and likewise will do everything in its power to assist those who feel that price cut is not justified. Certain Kansas districts have put on effective boycotts during the past few years in protest to action of some of the major purchasers and it is believed that state will foster a widespread campaign to the detriment of any purchaser taking the lead in a price cut.

Mid-Continent leaders seemed assured that the movement had lost its force and that a price cut has been averted at least temporarily. In a telegram to Carl Estes, Tyler publisher, Colonel Cicero Murray said, "I feel that this movement originated by the Standard of Indiana and Humble of Texas, and that they are behind this affair. I have conferred with certain leaders of the industry by wire today and feel that this price cut may be averted; at least I have hopes for that, and I am rather optimistic that it will not come notwithstanding the fact that it has been agreed upon, but believe by reason of fear that the parties behind the movement will not dare to place it in effect." Murray further stated that, "no reason exists now for a cut in the price of crude. However, the excuse now is the increased allowable in the East Texas field, which does not justify any cut."

Technical Aspects of Oil an

PONCA CITY, Okla. Oct. 1.

TURNING for the moment from engineering to the more technical problems of stabilization, speakers before the fall meeting of the Petroleum Division of the American Institute of Mining and Metallurgical Engineers here Friday and Saturday, laid before the industry probably the most comprehensive symposium on production rationalization yet developed.

The program committee demonstrated a full and comprehensive realization of present problems of the industry as evidenced by its selection of subjects and men to present them. Included in the gathering were men who have and are to play important parts in the industry's struggle for stabilization.

High point in the meeting Friday evening at a dinner when Charles Curtis, vice president of the United States made an address. Papers and discussions of the evening dealt exclusively with the subject of a rational program for the oil industry and means whereby such a program may be put into operation.

It was evident from the remarks of several of the leaders that in good times and bad the industry must have a rational program to which it can turn in solving the complex problems which now exist and will continue in the future regardless of the relation between supply and demand. If some of the beliefs develop to be facts it is apparent that the oil business will see some form of restriction whether it be proration, curtailed development or something which has not yet been devised.

Following are presented in digested form some of the more important aspectts dealing with methods and procedure in accomplishing any rationalization program:

A Rational Program for the Oil Industry

Extract of a Paper by

W. S. FARISH

"I CANNOT too strongly stress my feeling that the public interest in our petroleum resources transcends that of the producing industry itself." In those words the author expresses his belief in the soundness of efforts to rationalize operations of competing units in the oil industry, despite the existence of much hostility toward such rationalization.

"What we are proposing when we attempt to set up a 'rational' program for our industry is to guide it by the light of reason. A 'rational' program is one 'agreeable to reason.' We cannot succeed in establishing a rational program unless we have the temerity at least to record and to analyze our studies, our deliberations and our ideas.

"It would be extremely difficult to establish convincing evidence of even a modicum of rational planning in the present status of the oil industry . . . At the moment we are confronted with the necessity for substantial curtailment of supply." Present domestic crude oil production must be reduced about 200,000 barrels per day to avoid adding to already cumbersome stocks, with Texas alone now producing an excess of about 100,000 barrels per day. Actual over-supply temporarily engulfs the industry, to say nothing of additional potential over-production.

Refinery runs should be reduced, for with approach of winter and slackened consumption at least 200,000 barrels of oil in excess of requirements are being charged to stills daily. With excess crude seeking outlet or threatening to break out of control through failure of existing production restrictions, refinery operations are stimulated to excessive proportions.

Economic waste is involved in each of the above operations, and such waste must ultimately result in increased prices. Physical waste likewise arises under stress of over-supply, particularly in production operations; and out of excessive crude production over-expansion in all lines must follow. It is the latter excess, therefore, actual or threatened, that primarily demands remedy if a rational program is to be set up.

W. S. FARISH
President, Humble Oil & Refining Company

The most potent factor in causing overproduction is rooted deeply in our customs and laws. Drilling offset wells as provided in the laws does not always protect a lease owner against loss of part of the mineral wealth which originally lay under his land. In consequence, the effort of the old legal conception of the rights of oil and gas producers is to drive every producer to drill and develop his property and produce his oil.

To balance supply with demand properly involves consideration of various factors of perhaps complicated aspect; but it accomplishes so many things that are desirable that it becomes in reality the essence of a rational program, such as prevention of waste, maintenance of adequate petroleum reserves underground, and lowering costs of producing oil and of supplying its products to the consumer.

A rational program for the oil industry demands application of sound engineering principles to the exploration and exploitation of oil pools. At present there is particular need for the assistance of engineers in attempts to establish ratable withdrawals from different properties in a common pool.

To accomplish the things which a rational program for the oil industry calls for demands a great deal that is not immediately attainable. Most important is the need for further education both within and outside the industry as to the facts and principles involved.

This paper concludes with the following paragraph. "In conclusion, a rational program for the oil industry involves principally the maintenance during periods of temporary over-supply of the balance of supply and demand to the end that physical and economic waste shall be eliminated. There are, of course, vexing problems in other branches of the industry, such as refining and marketing, but these can be largely solved if the supply of crude is reasonably balanced with demand. A rational program is almost identical with a conservation program. Each one requires that sound engineering principles and practices be utilized to the fullest possible extent in the production of oil. More important, each one requires that the paramount interest of the public in our petroleum reserves be recognized and deferred to by the industry and protected in law."

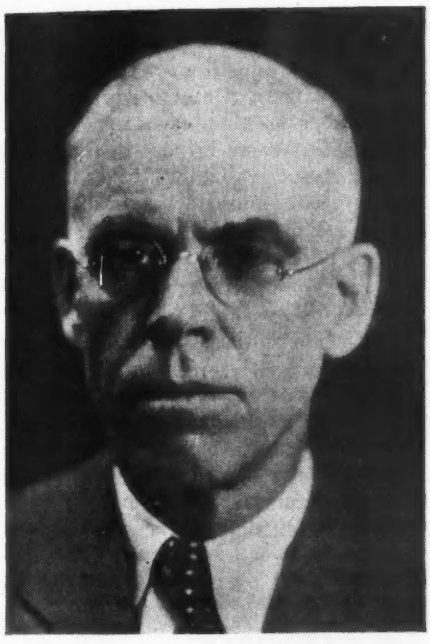
Gas Production Rationalization

The Place of Government, State and Federal, in Rationalized Mineral Production

Extract of a Paper by
C. K. LEITH

THE individualism which has made the mineral industry what it is is being daily restricted, and apparently still greater restrictions are in sight in the interest of group and national welfare.

We need not, however, jump to the other extreme and assume that centralized



C. K. LEITH
Chairman of the Department of Geology, University of Wisconsin

public control is a panacea for our troubles. It will be difficult to create public bodies sufficiently intelligent and free from political and self interest to make a better job of administration than that already existing. It will have a strong tendency toward freezing existing interests and practices. It will eliminate the many rapid adjustments inherent in diverse private control. It will tend to minimize the working of the law of survival by which the world has so far progressed, and to substitute an untested system whereby the weak and marginal operations are likely, for political reasons, to be carried along. We may be fooling ourselves in the belief that the world has yet progressed far enough to invent an effective substitute for the primitive law of survival of the fittest. The time will come in the not very distant future, when the job of meeting the demands for oil, as well as for certain other essential minerals, will require all the individual talent and flexibility we have, as in the past, and it remains to be demonstrated that anything in the nature of bureaucratic control will be equally efficient.

At best, while we may expect some gains from such organization, we must remember that it is likely to involve much sacrifice of individual rights and ambitions. Above all we must get away from the notion that any such plan will control the other fellow but leave us free. Today there are too many people who in one breath ask the government to assume certain responsibilities supposed beneficial to their interests, and in the next breath denounce that rapid encroachment of government into the field of private effort.

As a practical matter, therefore, if it becomes necessary in the public or group interest to relinquish any more of our private competitive control, I would favor proceeding slowly and by the cut and try method, testing carefully the results of each extension of collective control, public or private, before proceeding to the next.

The anti-trust laws should be modified to the extent of allowing private cooperative effort to meet the essential requirements of conservation. Such experiments with police powers as our states are trying should be studied with a view to their betterment. and coordination. The effect of tax policies should be taken into account. Naturally we should study our tariff and treaty powers, to see if they are being used to represent all American interests, to see if they harmonize with domestic legislation, to develop some semblance of a national mineral policy.

All of this means the extension of unofficial private collective effort and the promotion of understandings among the states; it means the more intelligent, and particularly the more coordinated, use of existing police, tariff, treaty, and tax powers—but it postpones the creation of new official bodies of national scope, it curbs our national passion for more, and yet more laws, until we are more certain than we seem to be today of the net gain to industrial and national welfare. No new commission can take over the existing state and national powers. Its powers will be merely supplementary and advisory to those already existing; and it is by no means clear whether such further subdivision of public control will help or hinder in clearing the present confusion of efforts to curb surplus development.

Reservoir Energy: Its Source, Ownership and Utilization

Extract of a Paper by
JOSEPH B. UMPLEBY

IN correlating fundamental engineering concepts with legal interpretation and field practice the oil industry is at the parting of the ways. The old concept that oil and gas are migratory and belong to him who reduces them to possession has come to be quite generally recognized as the basis of many of the serious ills and extravagances of the industry.

The important problem now, with laws being revised by legislatures and modified by court decisions, with added powers exercised by voluntary committees and official regulatory bodies, and with need for controlled output in the forefront, is to see to it that new law and action are based on sound engineering concepts.

Since the study of gas instituted by the Marland Committee of the American Petroleum Institute in 1927 much information has accumulated concerning the function of gas in development and production of oil, leading to the conclusion that every oil pool contains three resources: oil, gas, and reservoir energy. Because of their bearing on ownership, these three resources and

J. B. UMPLEBY
Petroleum Engineer

their source and utilization are paramount considerations. To facilitate the discussion here, it may be stated that the oil and gas in a particular tract should belong to the owners of mineral rights in that tract, but reservoir energy should be common property of all owners of mineral rights in the pool.

Reservoir energy is set apart by nature of its origin and existence. In origin it results from forces of compressing action on the entire contents of the reservoir. These forces may have many manifestations such as hydrostatic head, superimposed beds, or diastrophism, but in last analysis gravity, operating over a much wider area than the limits of the pool, is the cause. Reservoir energy depends on the continuity of the confining beds, so that puncturing the container at any single point affects the whole. It is more a conditioning factor than a recoverable resource. Its chief value results from work performed within the reservoir rather than work done at the surface. Compressor plants can duplicate such work as reservoir energy effects at the surface, but it is impossible to duplicate its work in the sand, because oil, in the absence of agitation, absorbs gas so slowly as to be negligible.

The demands of efficiency and conservation also place reservoir energy in a separate and distinct category. Best practice calls for the greatest production of oil at the least possible expenditure of reservoir energy. The energy system is exhausted long before the reservoir is drained of oil. Recovery probably does not exceed one-quarter of the oil in the sand. The greatest and most practical conservation applicable to oil pools is a proper conservation and utilization of reservoir energy to the end that ultimate recovery may be increased.

Thus reservoir energy is a status of the reservoir to be maintained for the common benefit rather than a product to be apportioned among individuals. It cannot be divided and maintain its usefulness. If reservoir energy is thus utilized, it is almost a corrolary that unit costs will be lowered, because additional recovery, a longer flowing life, and less fluctuations in production far outweigh deferred income.

If we accept reservoir energy as a status to be maintained for the common good rather than as a product to be divided, on the one hand, and apportionment of oil and gas among owners according to amounts in place, on the other hand, it becomes necessary to consider in detail the bearing of one further engineering fact.

Regardless of the nature and origin of the reservoir energy, the fact remains that in most pools it is stored in the gas—both in gas dissolved in oil and in free gas. The free gas is important because of its tendency to expand. The dissolved gas is important for this reason, and for the added reason that its presence makes the oil more fluid. If the free gas is allowed to escape, the dissolved gas becomes free gas progressively as the pressure drops. Hence in the ideal operation the gas of the reservoir should not be marketed until all the oil capable of economic recovery has been removed. If then, we consider oil and gas in the same category, what basis can we have for allowing the early production of oil and requiring the deferred production of gas? It would seem that this step must be based on principles of conservation, but equity clearly requires that the owner of the gas be compensated for deferred income.

It is hoped that discussion will take the two-fold direction of analysing first the soundness of the proposition from a technical viewpoint, and second, the consequence of its adoption from legal and operating angles. The first is peculiarly the problem of the scientist and engineer; the second belongs more to the lawyer and the executive. It is particularly fortunate that both groups are represented at this meeting.

Limitation of Production of Oil To Market Demand

Extract of a Paper by

ROBERT E. HARDWICKE

OIL men, legislatures and courts have reached highly conflicting conclusions during the past two years on the question of whether production of oil should be limited to market demand. Opponents of the plan assert it is a scheme of big purchasers to fix prices and create monopoly, while proponents declare it is necessary to prevent physical waste and that effect on price is merely incidental.

From an economic standpoint the limitation of production of any commodity to the demand therefor is in accord with sound principles. The evils following over-production are well known. Opponents of market demand regulation point to disastrous results of efforts to control silk, cotton, rubber, coffee, and so forth. But it should be recognized that attempted control of such commodities was different from that suggested for oil. With reference to petroleum, the idea is to prevent over-production, not to keep oil off the market and peg its price after it has been produced.

Furthermore, the peculiar characteristics of oil and gas, reactions taking place upon production, effect of production from one tract upon another create complications which do not exist with reference to other commodities. Thus analogies are virtually pointless.

It is now well settled that the state may regulate production of oil and gas to prevent waste. Decisions justify the conclusion or at least the argument that the right also exists to regulate production, irrespective of waste, in order to protect and adjust the correlative rights of the various owners of an oil and gas pool. If the mere drilling of offset wells does not offer complete protection of property rights it appears logical to say that the legislature may otherwise regulate production of oil to give better protection to the owners thereof.

In other words, one of the purposes of government is to adjust correlative rights, and scientific knowledge has advanced far enough to justify control of oil and gas production for the sole purpose of protecting interests of the various owners so that each will get his fair share. Waste by any operator reduces amount available to other owners of the pool, and thus prevention of waste is a proper factor in adjustment of correlative rights.

In over-production periods oil not needed for current use and consumption must go into storage. All storage in excess of that needed for working stocks and reasonable reserves is really unnecessary, and waste and evaporation incident thereto are avoidable and wasteful. Does it not follow that physical waste inevitably occurs above ground whenever there is production in excess of market demand?

In addition to above-ground waste, there is underground waste which is more serious. Assume that oil and gas should be produced so as to prevent dissipatoin of reservoir energy, premature and irregular water encroachment, and premature adandonment of wells; and concede that ratable production and maintenance of reservoir pressure are highly desirable to secure maximum ultimate recovery. Now suppose a pool is producing 100,000 barrels daily under absolutely ideal conditions. If overnight the demand from that pool is increased to 150,000 barrels, and such increase is allowed, serious underground waste would take place, and production restriction should be continued at 100,000 barrels strictly from a conservation standpoint, and the market demand limitation should have no bearing here.

If market demand from the field declines to 50,000 barrels, on the other hand, and output is maintained at 100,000 barrels the excess must go into storage, giving rise to waste incidental to that excessive above-ground storage. If ratably produced, reservoir pressure

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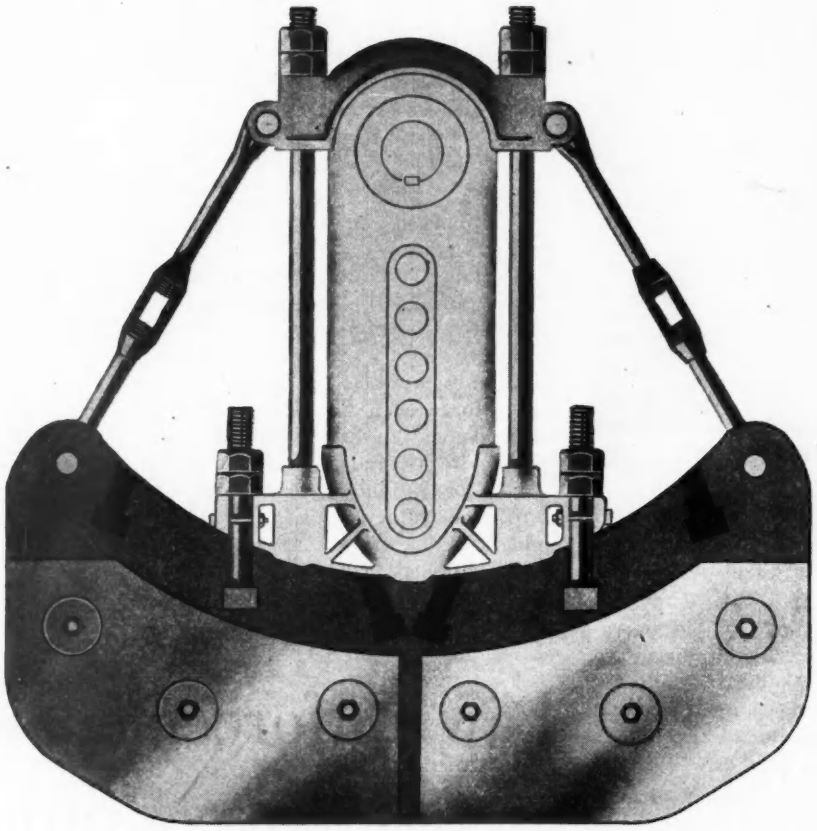

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R. E. HARDWICKE

would be maintained and water encroachment controlled, although efficient gas-oil ratio for some wells might be disturbed.

But it would be unlikely that operators would have sufficient storage to take care of the 50,000 barrels daily excess without resorting to open storage; and following are some of the results to be expected.

Some operators, having storage or market, would continue producing their full allowable; while others, having limited storage or market, would produce only a portion. Still others, having no storage or market, could not produce at all. Drainage across property lines and inequalities would necessarily occur.

Absence of ratable production which would thus arise would cause dissipation of gas energy, increase abnormally the drainage areas of some wells, cause concentrated withdrawals, upset uniform reservoir pressure and regular encroachment of water, and thus cause not only serious underground waste but inequalities as between property owners.

The above circumstances are closely similar to those involved in the Champlin case, which was decided by the United States Supreme Court, and in which it was held that ratable production, limited to market demand, prevented waste and adjusted the correlative rights of the various owners.

The Oil States Advisory Committee has recommended an interstate compact by virtue of which consumptive requirements will be apportioned among the states and production limited accordingly in the states. By proper apportionment marginal fields could be saved and discrimination by purchasers avoided. But from a practical standpoint the difficulties involved in equitable distribution of the allowable are numerous and serious, with widely differing conditions existing in different pools and states.

Following the above discussion, this paper by Mr. Hardwicke presents interesting discussion of claims that monopoly will be fostered by limiting production to market demand, concluding that requirements of all purchasers, big and little, should be considered in determining market demand.

The concluding paragraph of this paper is as follows: "If it be true that production of oil in excess of market demand brings about physical waste and that restriction of output to such demand prevents or minimizes such waste, the state may by proper legislation enforce such limitation. If it be assumed that the distribution of the allowable is fair and equitable then the control of production could also be justified as an act adjusting correlative rights of the various owners of the pool. Many good lawyers believe that proration, ratable production, ratable purchasing and other regulations of the amount and manner of production can best be justified and sustained on the correlative rights theory rather than on the waste or public rights theory. After all, the two are virtually inseparable."

Texas Ouster Hearing Postponed to October 13

Austin, Texas.—Trial of the state's anti-trust "ouster" suit which was scheduled for, Monday, October 3, has been postponed to Thursday, October 13. Due to the absence from the city of Attorney General Allred, who is personally handling the case, the cause for this move could not be learned.

When the case is called, W. R. Boyd, executive vice president of the American Petroleum Institute, and Paul E. Hadlick, secretary, will appear before Commissioner Geo. E. Shelly to present the evidence for which they have been subpoenaed by the state. The last testimony, that of R. C. Holmes, president of The Texas Corporation, was taken in July before the elections.

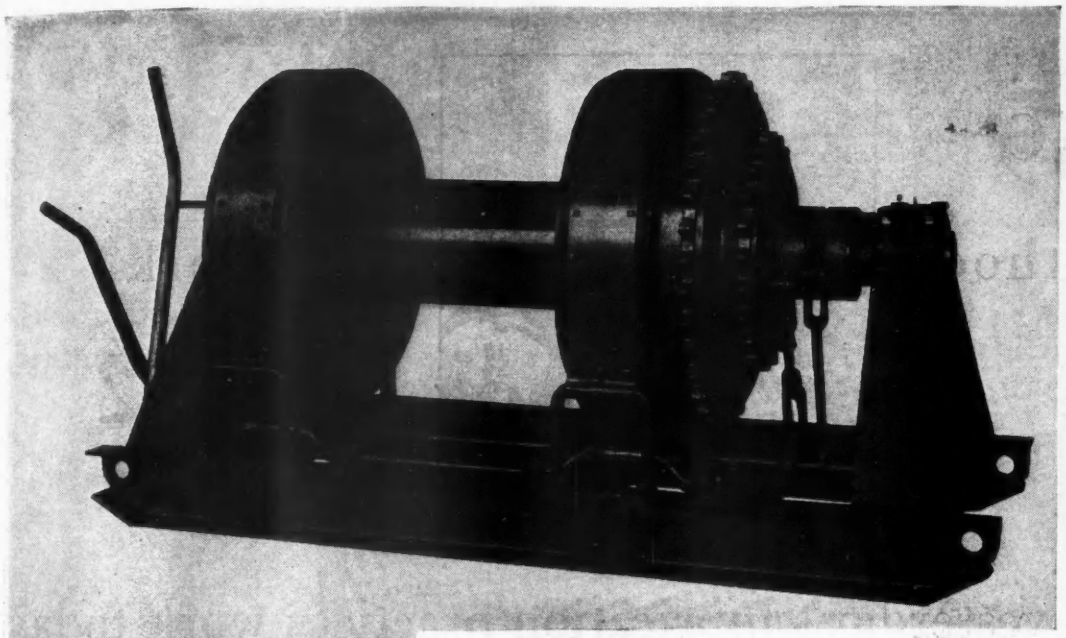
It is expected that actual trial of the case before Judge J. D. Moore will not begin until the January term of court, 14 months after the filing of the suit.

Law Enforcement *in East Texas Has Tendency to* Stop Oil Thefts

Tyler, Texas.—Oil stealing and wilful violation of production restrictions in the East Texas oil field is believed to have been virtually eliminated, for the time being at least, within a week after the creation of a special department by the Texas Railroad Commission to investigate and prosecute offenders. Observers report that adherance to proration was more general late last week than at any time since the field was placed on a straight well allowable some 12 months ago. Organized groups engaged in the actual stealing and transportation of illicit oil from wells have retired from their heretofore profitable business for fear of becoming engulfed in the dragnet thrown out by the staff of investigators. Assessment of a two-year jail term against an oil theft prosecution at Longview last week has proven conclusively that the clean up campaign has progressed beyond the bluffing stage.

The investigation bureau set up by the commission to operate as a unit of the oil and gas division was authorized during a visit in the field by the three commissioners September 21. F. Homer Pierson, Dallas, a deputy supervisor of the oil and gas division for the past eight years, was appointed head of the new department that is to check the activities of oil thieves and proration violators. Headquarters have been established at Tyler, with the operating force divided into day and night shifts. More than a half dozen employes of the commission's proration enforcement staff have been transferred to the investigaiton bureau in order to have the benefit of their general knowledge of the field, while the remainder of the personnel, which may total 50 full time employes, has been selected from applicants.

Although scores of persons have been arrested and indicted for stealing oil since last March 16, date of first indictments, all have made bond promptly and the charges apparently dropped. The responsibility for this apparent negligence has in the past undergone a buck passing procedure. County authorities have lately been assigned the full responsibility, while Attorney General James V. Allred has assigned an assistant to aid in the prosecution. As evidence that punishment is in store for detected oil thieves, a two year sentence was given C. A. Parker for alleged oil theft on September 27 at Longview. This is the first conviction.



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HOUSTON, TEXAS

MARKETS ~ STATISTICS

Extreme Weakness of Gasoline Market in Mid-Continent Laid to East Texas Stolen or Otherwise Cheap Crude; Natural Gasoline Stronger. California Lowered Allowable Not Expected to Reduce Stocks.

Production Rises and Outlook Is Menacing

CRUDE oil production of the United States continued during the week ending October 1 around the high level of the previous week, the national output continuing to reflect the 50,000-barrel increase in allowable made effective for the East Texas field September 1. The average daily output for the week of October 1 was 2,177,795 barrels according to estimates compiled by THE OIL WEEKLY, a decline of about 2000 barrels from the corrected figure for the previous week.

Analysis of figures by states shows that the most significant fluctuation was an increase of over 8000 barrels registered by the Texas Gulf Coast under the influence of rising output in the Conroe, Montgomery County, field, where a restraining court order against the railroad commission induced that body to withdraw its proration rules on September 24. There are over 20 producing wells in that new flush area, and since a sizeable drilling campaign is in progress further increase in production is anticipated during coming weeks unless authorities prove successful in reinstating proration there in the move which they have made toward nullifying the mentioned court attack by one of the Conroe producing companies. Output of the field last week was around 20,000 barrels daily.

The East Texas field also showed an increase of a few thousand barrels in daily production last week, but the rise was only a normal one brought about through the manner in which proration is enforced there, the output gradually rising after the first and middle days of each month following the periodic fixing of new, lower allowables, made to hold the field down to 375,000 barrels daily in the face of completion of almost 20 new wells each day.

The normal workings of that proration plan should result next week in a reduction of several thousand barrels in the field's output, to offset perhaps the anticipated increase at Conroe, for the railroad commission again scaled the allowable down for East Texas wells effective October 1. For the first half of October the quota is 44 barrels daily, as compared with 46 barrels for the latter half of September. There are over 8300 producing wells.

Led upward by the Gulf Coast fields and East Texas, the average daily production for Texas in the latest compilation was 922,160 barrels, a net increase of about 10,000 barrels.

California also lent its weight slightly toward keeping crude oil production up, registering a gain of 2000 barrels in producing 480,000 barrels daily. Kansas, Louisiana, and Arkansas showed practically no change in output.

Oklahoma, in contrast with all the previously mentioned states, lent its influence toward holding crude oil production down, furnishing a 4000-barrel decline by producing an average of 385,960 barrels daily. Oklahoma City and the Seminole district each contributed toward the decrease.

THE OIL WEEKLY
Estimated Average Daily Production in Barrels

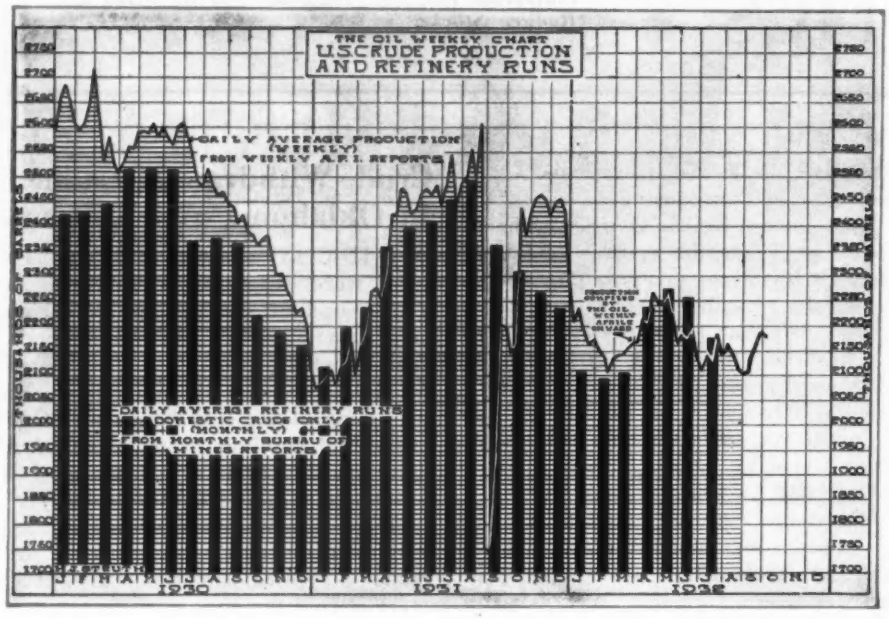
District—	For Week Ending	
TEXAS—	Oct. 1	Sept. 24
Texas Panhandle	47,725	46,700
North and West Central Texas	72,350	71,725
West Texas	171,200	171,100
East Central Texas	54,100	56,300
East Texas Field	377,000	375,500
South Texas	57,600	57,950
Total Texas outside Gulf Coast	179,975	779,275
Texas Gulf Coast	142,185	133,700
Total Texas	922,160	912,975
OKLAHOMA—		
Oklahoma City	70,245	71,080
Seminole District	130,960	133,620
Other Oklahoma	184,755	185,150
Total Oklahoma	385,960	389,850
KANSAS—		
Ritz-Decker	70,180	17,540
Voshell	6,550	6,610
Other Kansas	23,345	76,590
Total Kansas	100,075	100,740
LOUISIANA—		
North Louisiana	28,550	29,275
Louisiana Gulf Coast	34,700	34,700
Total Louisiana	63,250	63,975
Arkansas	32,250	32,600
CALIFORNIA—		
Long Beach	71,000	70,200
Santa Fe Springs	61,000	58,500
Midway-Sunset	49,600	49,400
Kettleman Hills	59,000	59,600
Other California	239,400	240,300
Total California	480,000	478,000
MOUNTAIN STATES—		
Wyoming	31,900	34,400
Montana	7,300	7,050
Colorado	2,600	2,700
New Mexico	32,000	31,950
Total Rocky Mountain States	73,800	76,100
Eastern States	95,800	99,650
Michigan	24,500	26,300
Total United States	2,177,795	2,180,190

Crude Withdrawal Resumed In Oklahoma and Kansas

MID-CONTINENT marketers were sitting back surveying a situation admittedly bad but one which may turn either way depending upon developments especially in East Texas which is receiving the full blame for the slump of the past few weeks. One of the Mid-Continent leaders has stated that stolen or illegally produced oil, which seems generally to be held responsible for present conditions, probably is playing a minor part in the crude oil price situation. However, there is no question but what considerable amounts of refined products from East Texas are reaching markets which normally would be supplied by Oklahoma and Kansas refiners. This material is moving at prices below the market and is produced either from illegally produced oil or sold at a loss to the manufacturers. With the slight margin between manufacturing cost and present quotations it is hardly possible that this movement could be carried on at anything but a loss assuming that refiners are paying the posted price for crude. There also is a possibility that crude legally produced in the East Texas field is being sold below the market.

Natural gasoline took an upturn during the week when the 26-70 grade reached three cents and sales were better than have been seen since early this year. This is one of the really bright spots in the market and a trend which may have a bolstering effect upon the whole structure. Burning oils were holding steady and all indications were that they have a good future during the next few months. Refiners have reduced runs to stills and no doubt will make further reduction to meet the emergency now existing, thereby tending to create a greater scarcity of supply and boost the price to higher levels.

Crude movement in Kansas and Oklahoma during the week ending September 20 reversed itself and changed to an estimated daily net withdrawal of 10,500 barrels compared with 6000 barrels daily to storage during the preceeding week. Although figures for the week ending September 27 are not now available it is expected that the net withdrawal will take a considerable


THE OIL WEEKLY CHART
U.S. CRUDE PRODUCTION
AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I. REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
1930
1931
1932

jump due to rumor of a crude price cut. Mid-Continent leaders were of the opinion that this cut has been averted at least temporarily but it is likely that many of the companies holding appreciable amounts of crude in storage will play on the safe side and empty as much space as possible under prevailing prices.

California Allowable Not Expected to Reduce Stocks

SWEEPING changes in the curtailment program have been made during the past week, the allowable for the remainder of the year having been fixed at 440,000 barrels daily or less, and open flow tests ordered for Long Beach, Santa Fe Springs, Playa del Rey and Huntington Beach. The committees working on a safe allowable for the state actually arrived at a figure below the one made public, but the 440,000-barrel allotment was a form of compromise. It is possible that the allowable may be around 430,000 barrels soon.

Open flow tests are being considered in other fields, but no definite plan has been announced. Most of the leading fields may ultimately be allowed to establish actual potentials. Such fields as Ventura Avenue, Elwood and Midway-Sunset may have a chance to establish their ability to produce wide open.

Operators will be forced to make up for their excesses during the open flow tests by cutting back enough within 30 days to equal what their production should have been. This means that the principal purchasers will take all legitimate excesses, but they will take only a limited production after the tests have been concluded.

The allowable of 440,000 barrels, or less, does not anticipate any reduction from stocks during the winter months, being based on actual demands. Previously, the allowables had sometimes been placed to force a slight reduction in stocks. This was particularly true during the early part of curtailment, but more recently the committees have attempted to balance production with demand only.

The flow test is already under way in the Playa del Rey field, and will be followed by tests at Long Beach, Santa Fe Springs and Huntington Beach.

The slight decline in local consumption marks the first time in years that gasoline sales have not exceeded those of the previous year. The decline has been small, but it has joind the loss in exports to create a lower demand.

Two Independents Adopt Humble Part Payment Plan

Wichita Falls, Texas.—Two independent refiners in North Texas have adopted the "Humble plan" of paying for 60 per cent of the oil run and storing the remainder for account of the producer. Olney Oil & Refining Company put such a plan into effect Setpember 24, involving about 100,000 barrels daily. Waggoner Refining Company failed in its efforts to return about 1600 barrels of daily runs from the South Vernon district to The Texas Pipe Line Company after having taken these connections away from the latter about 15 months ago, and on September 26 inaugurated the part payment plan on these particular connections. The bulk of the oil is produced by Phillips Petroleum Company.

Gasoline Weakness Due to Uncertainty in Crude

New York.—Current weakness in gasoline prices is attributable to uncertainty in the crude oil situation and does not necessarily mean that the oil industry is confronted with an era of prices below cost of production, in the opinion of Amos L. Beaty, president of the American Petroleum Institute. In a statement issued September 26, Mr. Beaty offers an analysis of the situation and concludes that if producers will courageously face conditions and reduce crude oil production to a proper level a perfectly healthy condition will result. His statement follows:

"My interpretation of the weakness in gasoline prices, which has resulted in some sharp general reductions, is that, owing to uncertainty in the crude oil situation, refiners, major and minor, have been crowding and chiseling, to work off their stocks, until the inevitable has happened. This does not mean that chaos is to reign, or that prices below cost are to continue indefinitely. Producers of crude oil have the power in their hands. If, instead of increasing their production as they have been doing recently, they will bring it down, even to a level with refinery demand and hold it there, conditions will improve, but production should be below refinery demand in order that surplus stocks above ground may be liquidated. Everything was moving along nicely, with moderate profits in most cases, until the Railroad Commission of Texas, yielding to the importunities of certain producers, recently increased the allowable of the East Texas field, and this was done despite the previous holding of the commission, made on more than one occasion, that production in excess of the old top allowable of 325,000 barrels daily for the field would result in waste of reservoir energy. This started an injurious trend, which was easy to foresee. It is up to the East Texas producers and the railroad commission to correct the recent error, and to bring about a perfectly healthy condition in the industry, now that a seasonal decline in consumption is occurring. Production in all fields should be reduced. I think producers are awake and that they will not ignore the lessons of the past. I expect to see them do something sensible and constructive."

Crude Runs to Stills, Motor Fuel Stocks, Gas and Fuel Oil Stocks and Cracked Gasoline Production, as compiled by A. P. I. for Week Ended September 24, 1932

(Figures in barrels of 42 gallons)

DISTRICT	Daily Refining Capacity of Plants			Crude Runs to Stills		MOTOR FUEL STOCKS					Gas and Fuel Oil Stocks	Daily Charging Capacity of Cracking Units			Cracked Production Daily Average
	Potential Rate	Reporting Total	Reporting %	Daily Average	% Operated	(a) At Refineries	(b) Bulk Terminals	(b) In Transit	(c) Other M.F. Stocks	Total Motor Fuel		Potential Rate	Reporting Total	Reporting %	
East Coast	644,700	638,700	99.1	443,000	69.4	4,603,000	8,267,000	1,156,000	330,000	14,356,000	9,285,000	344,400	326,400	94.8	83,000
Appalachian	144,700	137,500	95.0	88,000	64.0	1,017,000	444,000	.....	230,000	1,691,000	1,008,000	59,100	57,600	97.5	26,000
Ind., Ill., Ky	434,900	424,000	97.5	278,000	65.6	3,880,000	2,780,000	.....	170,000	6,830,000	4,299,000	341,400	328,200	96.1	82,000
Okla., Kans., Mo	459,300	405,800	88.4	224,000	55.2	2,967,000	706,000	.....	850,000	4,523,000	3,189,000	257,400	238,100	92.5	50,000
Inland Texas	315,300	227,200	72.1	85,000	37.4	1,092,000	30,000	.....	240,000	1,362,000	2,079,000	117,300	95,100	81.1	16,000
Texas Gulf	555,000	545,000	98.2	385,000	70.6	4,716,000	191,000	.....	240,000	5,147,000	10,493,000	506,500	495,500	97.8	87,000
Louisiana Gulf	146,000	142,000	97.3	86,000	60.6	1,283,000	162,000	.....	30,000	1,475,000	4,462,000	74,400	74,400	100.0	14,000
North La.,—Ark	89,300	84,500	94.6	43,000	50.9	95,000	20,000	.....	60,000	175,000	580,000	29,500	25,500	86.4	10,000
Rocky Mountain	152,000	139,000	91.4	31,000	22.3	1,375,000	.....	.....	20,000	1,395,000	516,000	71,400	68,100	95.4	8,000
California	915,100	866,100	94.6	441,000	50.9	12,544,000	.....	.....	2,830,000	15,374,000	100,151,000	197,700	197,700	100.0	46,000
TOTALS WEEK: September 24, 1932	3,856,300	3,609,800	93.6	2,104,000	58.3	33,572,000	12,600,000	1,156,000	5,000,000	52,328,000	136,062,000	1,999,100	1,906,600	95.4	422,000
September 17, 1932	3,856,300	3,609,800	93.6	2,058,000	57.0	34,261,000	12,278,000	1,610,000	4,950,000	53,099,000	135,271,000	1,999,100	1,906,600	95.4	444,000
Below are set out estimates of Crude Runs to Stills and Motor Fuel Stocks on B. of M. Basis for week Sept. 24, 1932 compared with certain Sept. 1931 Bureau figures.															
Estimate B. of M. basis Week Sept. 24, 1932				2,190,000	(d)	34,070,000	14,250,000		5,000,000	53,320,000					448,000
U. S. B. of M. September 1931 Figures:—					9/1	33,928,000	12,757,000		4,125,000	50,810,000					
September 1931 Daily Average Crude Runs				2,503,000	9/30	32,294,000	13,831,000		3,997,000	50,122,000		September 1931 Daily Average Cracked Prod.			505,000

(a)Stocks at refineries, except in California district, which includes stocks of finished gasoline and engine distillate at refineries, at water terminals and at sales distributing stations and any amounts in transit thereto.
(b)By districts, East of California only. In California, bulk terminal and in transit stocks are included under "At Refineries" heading. See note (a).
(c)Estimated. Includes motor fuel in pipe lines and unblended natural gasoline at refineries and plants, also blended M. F. at plants.
(d)Estimated to permit comparison with A. P. I. Economics Report which is on Bureau of Mines basis.

Comparison of Permits Granted for New Wells

	For week ending Sept. 23	Total this month	Total this year	Total this date last year	1931 year total
Arkansas	1	3	16	27	34
California	6	26	284	287	342
Louisiana	18	61	283	245	309
Kansas	18	65	285	343	475
Oklahoma	20	112	682	636	842
Texas	221	752	4850	4613	6961
Total	284	1019	6400	6151	8963

Summarized Review of Field Results

State—	Completions	Oil Wells	Gas Wells	Failures	Initial Prod.
Arkansas	1	0	1	0	0
California	5	4	0	1	2,615
Illinois	0	0	0	0	0
Indiana	2	0	1	1	0
Kansas	11	8	0	3	944
Kentucky	19	16	0	3	655
Louisiana	9	3	1	5	3,975
Michigan	7	4	0	3	3,425
Mississippi	1	0	1	0	0
New Mexico	2	0	0	2	0
New York	0	0	0	0	0
Ohio	20	6	8	6	203
Oklahoma	22	16	0	6	22,170
Pennsylvania	1	0	0	1	0
Texas	148	124	0	24	802,930
West Virginia	0	0	0	0	0
Miscellaneous	3	0	0	3	0
Total	251	181	12	58	836,917

Oklahoma Allowable Hearing October 10

Oklahoma City.—The Oklahoma Corporation Commission announced during the week that its hearing to determine probable market demand for the last quarter of the year has been postponed until October 10 at which time it expects to issue an order continuing in effect the allowables heretofore determined until October 15, 1932. It has been the practice heretofore that purchasers meet with the state proration umpire on some date preceeding that set for hearing before the commission. Due to the death of Burt H. Collins, brother of Ray Collins the state umpire, the state-wide meeting was not held as scheduled. Hearing before the commission had been set for September 28. It is believed that in the hearing of October 10, producers will make a strenuous effort to secure a larger outlet for the Oklahoma City pool which now has a daily market demand of 75,730 barrels compared with approximately 130,500 barrels for the Seminole district. It is contended by those producers having production in the Oklahoma City pool and little or none in the Seminole district that equity is not being done in the matter of allocation of state demand while those having their major holdings in the latter are contending that the fields cannot be produced at a smaller allowable in view of a serious water threat. In one of the recent hearings it was testified that for every barrel of oil produced in the Seminole district more than one and one-half barrels of water must be handled.

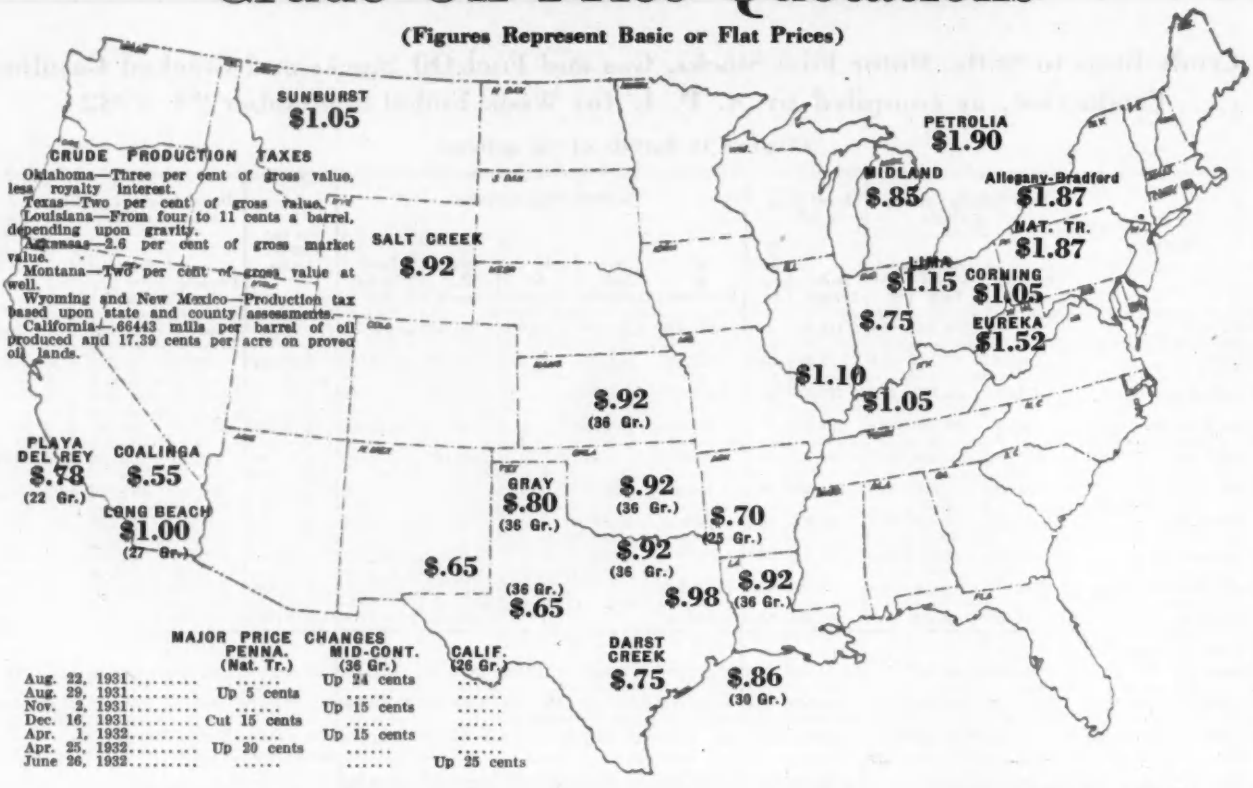
Geologists Annual Meeting In 1933 to Be at Houston

Houston.—This city has been chosen for the annual convention of the American Association of Petroleum Geologists to be held March 23, 24 and 25.

Program and arrangements plans of the local chapter of the association for taking care of the convention will not be developed and announced until after election of Houston chapter officers October 7.

Crude Oil Price Quotations

(Figures Represent Basic or Flat Prices)



MAJOR PRICE CHANGES

	PENNA. (Nat. Tr.)	MID-CONT. (36 Gr.)	CALIF. (26 Gr.)
Aug. 22, 1931	.....	Up 24 cents	.....
Aug. 29, 1931	Up 5 cents	.....	.....
Nov. 2, 1931	.....	Up 15 cents	.....
Dec. 16, 1931	Cut 15 cents	.....	.....
Apr. 1, 1932	.....	Up 15 cents	.....
Apr. 25, 1932	Up 20 cents	.....	.....
June 26, 1932	.....	.....	Up 25 cents

Official Postings and Differentials *(Revised to September 30, 1932)*

CALIFORNIA: (Effective June 26, 1932).

Signal Hill, Seal Beach, Alamitos Heights, Huntington Beach, Olinda-Brea Canon, Torrance, and Richfield: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 69 cents; 21 gravity 74 cents; 22 gravity 79 cents; 23 gravity 84 cents; 24 gravity 89 cents; 25-25.9 gravity 93 cents, top posting for Torrance and Richfield; 26-26.9 gravity 97 cents, top price for Seal Beach, Alamitos Heights and Huntington Beach: 27-27.9 gravity $1.00; 28-28.9 gravity $1.03, the top price for Olinda Brea Canon; 29-29.9 gravity $1.06; and 30-30.9 gravity $1.09, the Signal Hill top posting.

Inglewood: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 71 cents; 21 gravity 77 cents; 22 gravity 82 cents; 23 gravity 87 cents; 24-24.9 gravity 92 cents, the top price.

Playa Del Rey: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 69 cents; 21 gravity 74 cents; 22 gravity 78 cents; 23 gravity 82 cents; 24 gravity 86 cents; 25 gravity 91 cents; 26-26.9 gravity 96 cents, the top price. Field gathering charges of 5 cents a barrel.

Athens, Rosecrans and Dominguez: 24-24.9 gravity 89 cents; 25-25.9 gravity 93 cents; 26 gravity 97 cents; and 27-27.9 gravity $1.00 with three cents additional for each degree gravity upward, endipg at 32-32.9 gravity $1.15.

Elwood Terrace: 33-33.9 gravity $1.04 and 6 cents more for each additional degree of gravity, ending with 37-37.9 gravity $1.28, all prices f.o.b. ship.

Whittier and LaHabra: 14 to 19.9 gravity 65 cents; 20-20.9 gravity 68 cents; 21 gravity 72 cents; 22 gravity 77 cents; 23 gravity 83 cents; and 24-24.9 gravity 89 cents, the top price.

Montebello: 14 to 20.9 gravity 65 cents; 21-21.9 gravity 67 cents; 22 gravity 70 cents; 23 gravity 73 cents; 24 gravity 76 cents; 25-25.9 gravity 80 cents, the top price.

Coyote Hills: 14 to 20.9 gravity 65 cents; 21-21.9 gravity 66 cents; 22 gravity 70 cents; 23 gravity 76 cents; 24 gravity 81 cents; 25 gravity 86 cents; 26 gravity 90 cents; 27 gravity 94 cents; 28 gravity 98 cents; 29 gravity $1.02; and 30-30.9 gravity, $1.05, the top price.

Santa Fe Springs: 24-24.9 gravity 73 cents; 25 gravity 79 cents; 26 gravity 84 cents; 27 gravity 89 cents; and 28-28.9 gravity 94 cents, with 4-cent differential for each degree of gravity upward to 35-35.9 gravity $1.22.

Newhall, McKittrick and Kern River: 14 to 19.9 gravity 55 cents.

Midway-Sunset, Elk Hills and Buena Vista: 14 to 19.9 gravity 55 cents; 20-20.9 gravity 59 cents; 21 gravity 63 cents; 22 gravity 69 cents; 23 gravity 75 cents; 24 gravity 81 cents; 25-25.9 gravity 87 cents and 5-cent differential for each additional degree gravity ending with 30-30.9 gravity $1.12.

Lost Hills: Same as Midway-Sunset up through 25-25.9 gravity 87 cents, then 26-26.9 gravity 91 cents; 27 gravity 94 cents; 28 gravity 99 cents; 29 gravity $1.02; and ending 30-30.9 gravity $1.05.

Coalinga: 14 to 19.9 gravity 55 cents; 20-20.9 gravity 59 cents; 21 gravity 62 cents; 22 gravity 65 cents; 23 gravity 68 cents; 24 gravity 72 cents; and ending 25-25.9 gravity 75 cents.

Wheeler Ridge: 14 to 19.9 gravity 55 cents; 20-20.9 gravity 57 cents; and 21-21.9 gravity 60 cents, with 3 cents more for each additional degree of gravity, ending 25-25.9 gravity 72 cents.

Oklahoma, Kansas, North Texas: (Effective April 1, 1932).

Below 29 gravity: 76 cents with differential of 2 cents for each degree to 40 gravity and above which is posted at $1.00

North Texas: (Effective April 1, 1932).

Below 29 gravity, 76 cents, with two-cent differential upward, ending 40 gravity and above, $1.

Texas Panhandle: (Effective April 1, 1932).

Gray County: Below 35 gravity: 76 cents, with differential of 2 cents for each degree to 40 gravity and above, 88 cents.

Carson and Hutchinson Counties: Below 35 gravity: 66 cents with differential of 2 cents for each degree to 40 gravity and above which is posted at 78 cents.

West Texas: (Effective April 1, 1932).

Crane-Upton, Crockett, Ector, Howard-Glasscock, Pecos and Winkler Counties, Texas and Lea County, New Mexico: 65 cents.

Southwest Texas: (Effective April 11, 1932).

Refugio Heavy: 80 cents.

Refugio Light: (Same as Gulf Coast—see below).

Gulf Coast: (Effective April 1, 1932).

Goose Creek, Hull, Liberty, Orange, Pierce Junction, Mykawa, Moss Bluff, Raccoon Bend, Barbers Hill, Sour Lake, Spindletop, Sugarland, West Columbia, Humble and Refugio Light: Below 25 gravity: 80 cents, with differential of 1 cent for each degree to 40 and above which is posted at $1.00.

Mirando: 80 cents; **Salt Flat:** 75 cents; **Darst Creek:** 75 cents; **Pettus:** $1.00; **Markham:** Same as Gulf Coast.

Conroe, Texas: (Effective July 18, 1932).

Two-cent differential applies, beginning 35-35.9 gravity, 90 cents, ending 40 gravity and above, $1.

East Texas: (Effective April 1, 1932).

Flat Price: 98 cents.

North Louisiana and Arkansas: (Effective April 1, 1932).

Caddo, Homer, Haynesville, Bull Bayou, Sabine, Cricton, De-Soto, El Dorado, Cotton Valley, Sarepta, Cartersville: Below 25 gravity 68 cents with differential of 2 cents for each degree beginning with 25 gravity and ending with 40 and above. Top price $1.00 a barrel.

Smackover: 65 cents.

Rocky Mountain States: (Effective June 1, 1932).

Salt Creek: Below 29 gravity 76 cents; 29-29.9 gravity 78 cents with differential of 2 cents each degree to 40 and above. Top price $1.00.

Elk Basin and Grass Creek: $1.10; **Big Muddy:** 98 cents; **Lance Creek:** $1.15; **Rock Creek:** 90 cents; **Sunburst:** $1.05; **Osage:** 98 cents; **Cat Creek:** $1.20; **Pondera:** 90 cents; **Hogback, New Mexico:** 80 cents.

Mid-Western States: (Effective April 11, 1932).

Lima: $1.15; **Indiana:** 75 cents; **Illinois:** $1.10; **Princeton:** $1.10; **Wooster:** $1.25; **Western Kentucky:** $1.05.

Pennsylvania: (Effective September 13, 1932).

Bradford District: $1.87; **National Transit Oil:** $1.87; **Southwest Pennsylvania Pipe Line Oil:** $1.57; **Eureka Pipe Line Oil:** $1.52; **Buckeye Pipe Line Oil:** $1.37; **Corning Crude:** $1.05.

Michigan: (Effective July 13, 1932), **Midland:** 85 cents a barrel. **Muskegon:** 76 cents to $1.00 a barrel.

Canada: (Effective Nov. 3, 1931).

Petrolia: $1.90; **Oil Springs:** $1.97.

Oil and Gas Content OF LAND AS SUITABLE STANDARDS OF Each Owner's Right

E. H. GRISWOLD
Continental Oil Company, Ponca City, Oklahoma

THE many complexities arising from our present oil pool proration systems emphasize the need for a suitable standard of property rights. Attempts at conservation and unitization agreements have frequently failed because of the lack of such a standard.

The necessity of reducing production to consumption has caused umpires, committees, commissions and other governing bodies to allocate the production of flush fields among the respective owners. The methods of allocation vary widely and conservation of underground reserves is frequently neglected or misused.

Critical economic conditions increase, rather than modify, competitive methods. In some fields we have irregular and uneconomically close well spacing. Many operators drill unreasonably large holes, take excessive sand penetrations or leave their wells untubed in order to secure higher potential open flow tests than their offsets. All of these practices result in economic waste and frequently damage to the pool.

Regardless of our agreement with the fundamental principles of proration or unitization, both are actual necessities in many of our present economic situations, and we are in urgent need of a suitable standard of rights to facilitate and simplify their operation.

The problems pertinent to unit management are simple and of daily use in many partnership enterprises, but the problems of fair and proper division of production under either proration or unitization are, as yet, subject to controversy. The rights of respective owners must be ascertained and standardized before we can eliminate wasteful practices and still preserve constructive competition in our industry.

In a recent unitization conference it was found that each participant had a different basis for calculating the relative values of tracts. Some of these assumptions were as follows:

a. Unrestricted open flow operation to abandonment.
b. Current proration system to abandonment.
c. Strict enforcement of conservation laws without proration.
d. Oil content in place under various tracts.
e. Present market value.
f. Nuisance value to remainder of pool.

The valuation aspect of different operators vary with their status. The producer who also refines and markets petroleum looks upon proven reserves in a different light as compared to the one who produces only.

The operator who places the greater proportion of his exploitation expenditures in geological exploration and leases only selected acreage has a different aspect of unproven areas than one who checkerboards large spreads of acreage with little geological expense.

The small producer who has few other prospects can not assume a give and take attitude in the trust of balancing out in the average of several projects.

The royalty owner has little interest in the relative development and operating costs of various tracts, as the operators are obliged to protect each tract from drainage. The royalty owners desire increased recovery and ample drilling and although the two are usually synonymous they are not always consistent with the greatest economic yield to the operator.

In this discussion, which was delivered before the American Institute of Mining and Metallurgical Engineers, Ponca City Meeting, September 30 - October 1, Mr. Griswold proposes a method of acreage participation in production of a common pool that, while not theoretically ideal, he believes to be equitable and practical above present practices of proration.

E. H. GRISWOLD

There are certain dangers to the operator as a result of the standardization of property rights. Definitely established rights may promulgate drainage suits on our currently operated properties. The present legal status of these rights appears to be so confusing that there is no substantial basis for drainage suits, but if these rights are definitely ascertained there will undoubtedly follow many just or unjust claims for damages, regardless of whether or not a new legal ruling is retroactive.

The lawyers inform us that we have two rather contradictory laws applicable to oil and gas. In some states oil and gas are not owned until recovered at the surface. In other states they are owned in place underground with the provision that each owner must so use his property as to not injure the contents of any other property. In some states proration, to be legal, must be in proportion to ability to produce oil, while many states have no established system, each pool being prorated according to local regulations. In spite of this haze of legal precedent, we are assured by the lawyers that if a practical and equitable system of allocation of producing rights can be devised, the same can be made legal.

First we must establish a practical standard of rights and then we must set up suitable means of protecting these rights, unless such protection is inherent in the standard.

Fortunately we are required to deal only with the relative values of different tracts in a pool, rather than required to determine actual barrels of oil or dollars.

A suitable system must be adaptable to all steps in pool administration, so that relative values will be consistent under unrestricted operation, proration or unitization.

If the relative values of tracts were to change in passing

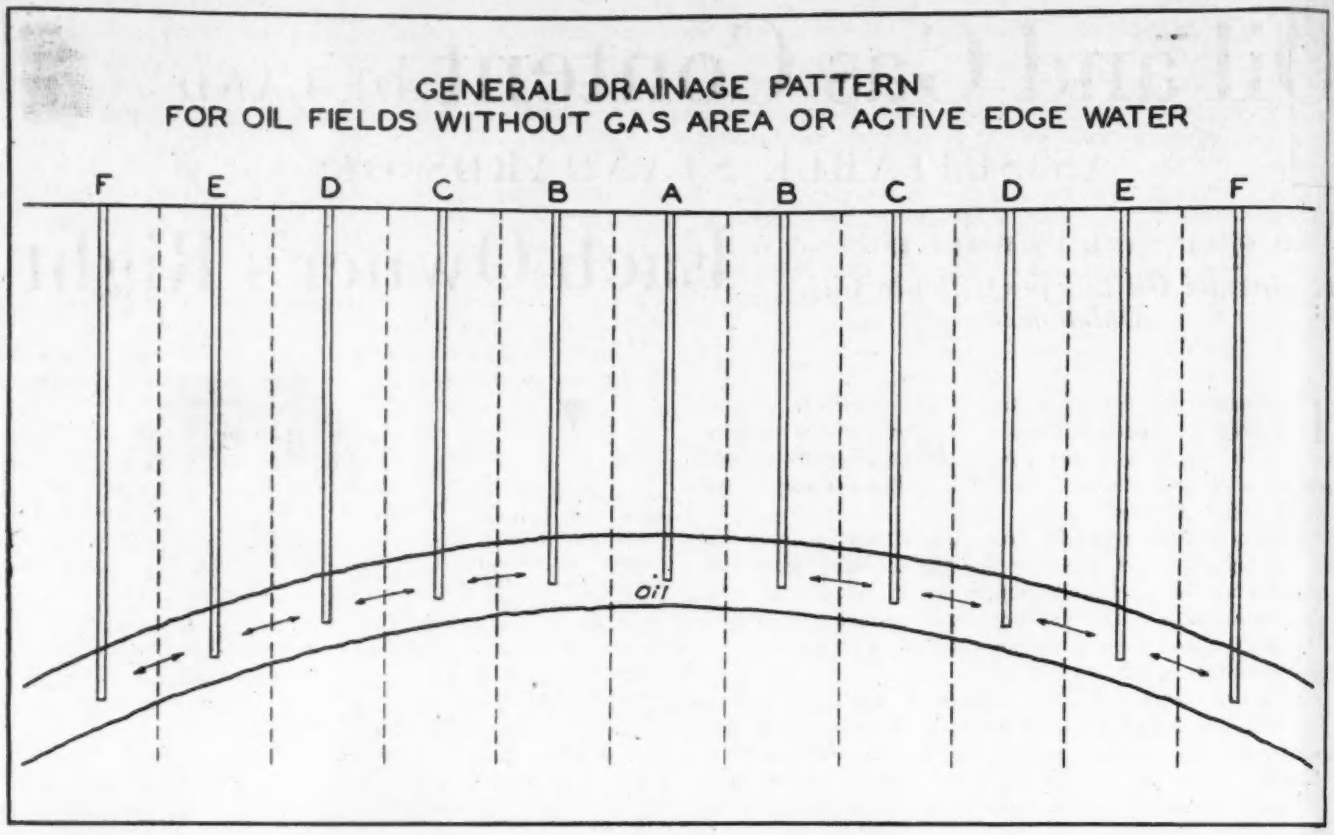


FIG. 1

from unrestricted operation to proration or to unitization, the personal interests of the owners would not be consistent with the best interests of the common pool. This is believed to be the major and most difficult requirement of a suitable standard.

To be legally practicable the standard must fit all stages in the development of a pool, all crude price conditions and all oil pools. It must be flexible and yet exact.

From the legal viewpoint only a "reasonable" degree of accuracy is necessary in the allocation of rights. We have several pools each with over 100 million barrels expected ultimate recovery, so that one per cent is frequently equivalent to at least a million barrels. Therefore, the producers interpretation of "reasonable" runs into several decimals when considering unitization. In contrast are many proration systems in which the accuracy certainly fails to qualify as "reasonable."

Means must be provided for adjusting values as the proven boundaries of a pool are extended. It has also been suggested that the relative values of tracts within a pool can be adjusted on the basis of their subsequent yield. These latter adjustments will prove impractical in pools where it is necessary to alter normal drainage patterns in order to affect gas or water control.

There is considerable controversy concerning the owner's rights in those tracts which will not justify drilling, but are subjected to drainage. Some legal interpretations would require their consideration and remuneration. There is, however, an opposite precedent in the Apex Mining Law, under which the owner of a vein outcrop may mine his vein an unlimited distance at right angles to the strike, regardless of who owns the surface under which he operates. This law permits one operator to profitably mine a vein which could not yield economic returns to several separate operators.

There have been suggestions that oil pools be operated in such a manner that no drainage will occur across property lines, the control being by equivalent bottom hole pressures while wells are producing, or similar methods. Such means may be applicable under ideal conditions but are certain to add to the expense of operation and interfere with conservation measures. Any practical system of establishing rights must not appreciably increase operating expenses or else the cost of theoretical justice may consume the proceeds.

Assuming that a standard of rights which meets the foregoing requirements is obtained, what means of protecting the owner's rights will be available in non-unitized pools? If one owner desires to drill a well, the offset has recourse only to a similar procedure, as certainly his rights cannot be protected by law or otherwise from drainage unless he does drill. After both wells are drilled, one operator having a market for his oil desires to produce all he can without committing waste of his resources. The other with perhaps no market or desire to produce must either store his oil, suffer drainage or secure ratable taking between tracts. The legal status of ratable takings appears to be considerably involved, but the determination of the ratable amounts reverts back to some standard of rights, supposedly determinable by engineering methods.

East Texas System Poor Approach

Present proration systems appear to be based on one or a combination of two governing factors. These factors are potential production and acreage. The equal well allowable as used in East Texas is a poor approach to the acreage system, because of the unequal spacing of wells.

Proration in direct proportion to potential production is in effect, proportional to sand permeability and thickness. As porosity usually varies somewhat with permeability, this type of proration is roughly proportional to the oil content of tracts in so far as relative rates of production on tracts of equal size are concerned.

Proration by acreage or by acre feet are approximations of oil content in place. Acreage alone is very inaccurate unless sand thickness and porosity are uniform. Acre feet systems have a degree of accuracy comparable to the uniformity of porosity throughout a pool. In proration systems where combined potential and acreage or acre feet are used, the approach to

oil content in place is probably more accurate because the average of two methods is used in determining the same problem. The relative weights given each factor in determining the average such as the 25 per cent acreage—75 per cent potential, used in some fields, are strictly arbitrary with no sound basis.

Inasmuch as oil content in place appears to be a widely accepted standard of ownership, and by far the most simple from a legal viewpoint, it deserves further consideration in regard to the degree of accuracy obtainable. Factors usually determined with "reasonable" accuracy in the development of the average sandstone oil pool are as follows.

1. Area of productive acreage on each tract.
2. Thickness of producing sand on each tract.
3. Location of gas-oil and water-oil contacts.
4. Reservoir pressure.

Also a fair conception of the uniformity of porosity may be had from initial productions of wells, consideration of course being given to the time element between completion dates. In fields where comparable initial productions vary over wide ranges or where porosity and permeability are known to be inconsistent with respect to each other, recourse may be had to porosity determinations from core samples. However, in the opinion of the writer, initial productions of wells are as representative in regard to porosity determinations as a core from a well is representative of the surrounding acreage.

Using the four factors mentioned above and reasonable porosity estimates, the relative total oil content of each tract in a sandstone pool is easily ascertainable. Limestone pools present more difficult and perhaps insoluble problems.

The determination of recoverable oil content is entirely different than total oil content, unless permeabilities are uniform. An extended discussion of this difference by the writer would lead to no practical conclusions as he knows of no evidence upon which the oil content of tracts can be accurately classified as recoverable or unrecoverable in place. The practical difference will be negligible in many pools but will be indicated in other pools by the failure of tracts to meet their allocated producing rate at some period in their life. In this manner any inequities resulting from differences between total oil content and recoverable oil content will be approximately adjusted in the practical application of the oil content theory to proration.

Underground Status of Oil and Gas

As our data on the recovery from oil pools pertain only to the oil recovered through wells on certain tracts and not to the oil originally contained under these tracts, we have no definite information upon which to decide from whence the oil is produced. To interfere legally or technically with the laws of nature has in most industries been found less satisfactory than an intelligent application of these laws. If the producer's rights can be made consistent with natural drainage, many costly errors can be avoided.

A brief review of the theoretical drainage trends in various type oil fields will be helpful in determining the natural process of recovery as compared to total oil in place in the reservoir. For simplicity we can assume that determinable factors such as well spacing, sand thickness, porosity and permeability are uniform in considering Fig. 1, 2 and 3, so that the original cubical contents of each tract may be equal.

Figure 1 illustrates the type of pool in which there is no gas area or active edge water. From this type of pool relative recoveries from tracts will closely approximate the relative original distribution of oil underground, if the rate of production is proportional to the oil content under each tract.

Figure 2 illustrates the type of pool in which there is a gas area and high gas-oil ratio area but no active edge water. If the rates of oil production on tracts are proportional to their oil content there may be migration toward the gas areas because of the greater displacement of the gas necessarily produced and the expansion of the dissolved gas within the oil. If the rate of total displacement of oil and gas taken from tracts is in proportion to the underlying total volumetric contents of these tracts, there will be migration of oil from the high gas-oil ratio areas to the lower gas-oil ratio areas, because of the expansive nature of the gas as compared to oil.

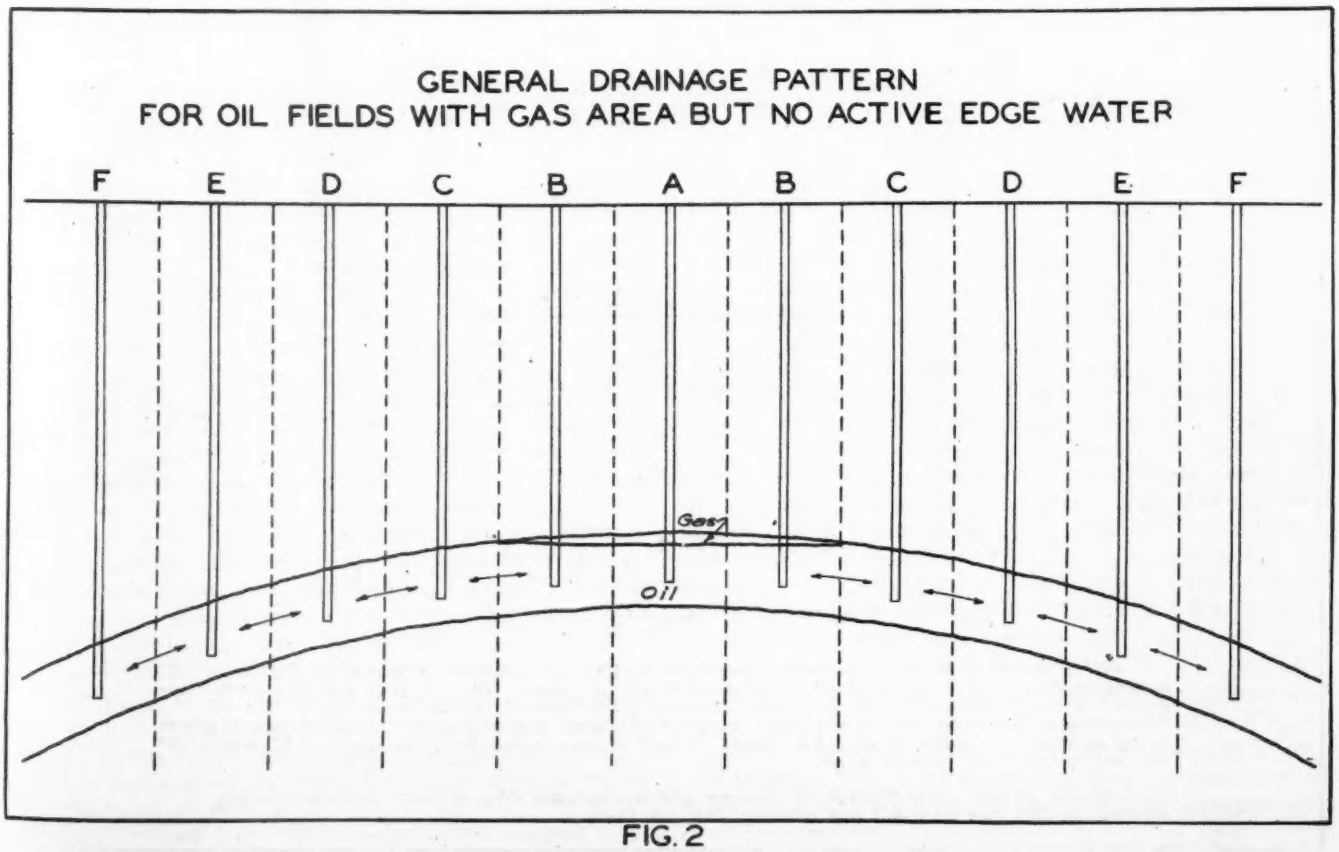


FIG. 2

This situation is identical with the results of maintaining uniform bottom hole shut in pressures throughout a pool in which the pressures are declining.

If the gas and high gas-oil ratio areas are restricted as compared to the low gas-oil ratio areas, there will be down structure migration when oil is withdrawn from the oil areas, as evidenced by the spreading gas caps in several conservatively operated pools.

Figure 3 shows a pool with both gas area and active edge water. If the pool is produced at a faster rate than the water can maintain the reservoir pressure, conditions similar to those of Figure 2 will obtain between the gas and oil areas. If production is restricted to allow pressure maintenance by the encroaching water, there will be continuous upstructure migration if appreciable amounts are produced from the various tracts in the pool. The gas-oil content can be maintained constant by closing in the gas area, but the water-oil contact will be advancing at such a rate as to cause the productive lives of the structurally higher tracts to be many times longer than the life of the lowest oil producing tracts. Thus the higher tracts would ultimately produce much more oil than lower tracts of similar original oil content, unless all except the lowest oil producing tracts were kept shut in until each tract had successively recovered its production in the order of their respective structural positions.

Most of our present oil pools fall in the types illustrated by Figures 2 and 3, and are, of course, further complicated by irregular time and location of development, irregular porosity, permeability and thickness of sand and other variables. In spite of these complexities, the outstanding drainage trends shown above persist and may be summarized as follows:

(1) Unless high gas-oil ratio properties are permitted to produce at greater displacement rates than lower gas-oil ratio properties, drainage of oil will be from the higher to lower areas in pools where reservoir pressures are not maintained at the original value.

In cases where the normal drainage is artificially disturbed in order to conserve gas, oil and gas are automatically displaced from the high gas-oil ratio tracts to lower tracts.

(2) In natural water drive pools the migration of oil is in an upstructure direction unless all except edge tracts have their production deferred until the water-oil contact reaches the boundary of each tract.

Where natural water drive is a factor the higher structural operator appears to have an inherent natural right to a longer producing life and greater recovery.

The above two trends will affect the relative recoveries of tracts as compared to their oil content in a degree roughly proportional to the average permeability of the reservoir rock in the pool. That is, the effects will be much more severe in pools of high initial well production and may account for as much as 100 per cent difference between the recoveries of tracts which are identical except for structural position. It would, therefore, appear unwise to neglect these natural laws in devising a system of rights.

The principal difference between allocating production under proration as compared to unitization or common ownership is the abandonment feature. When a prorated property is no

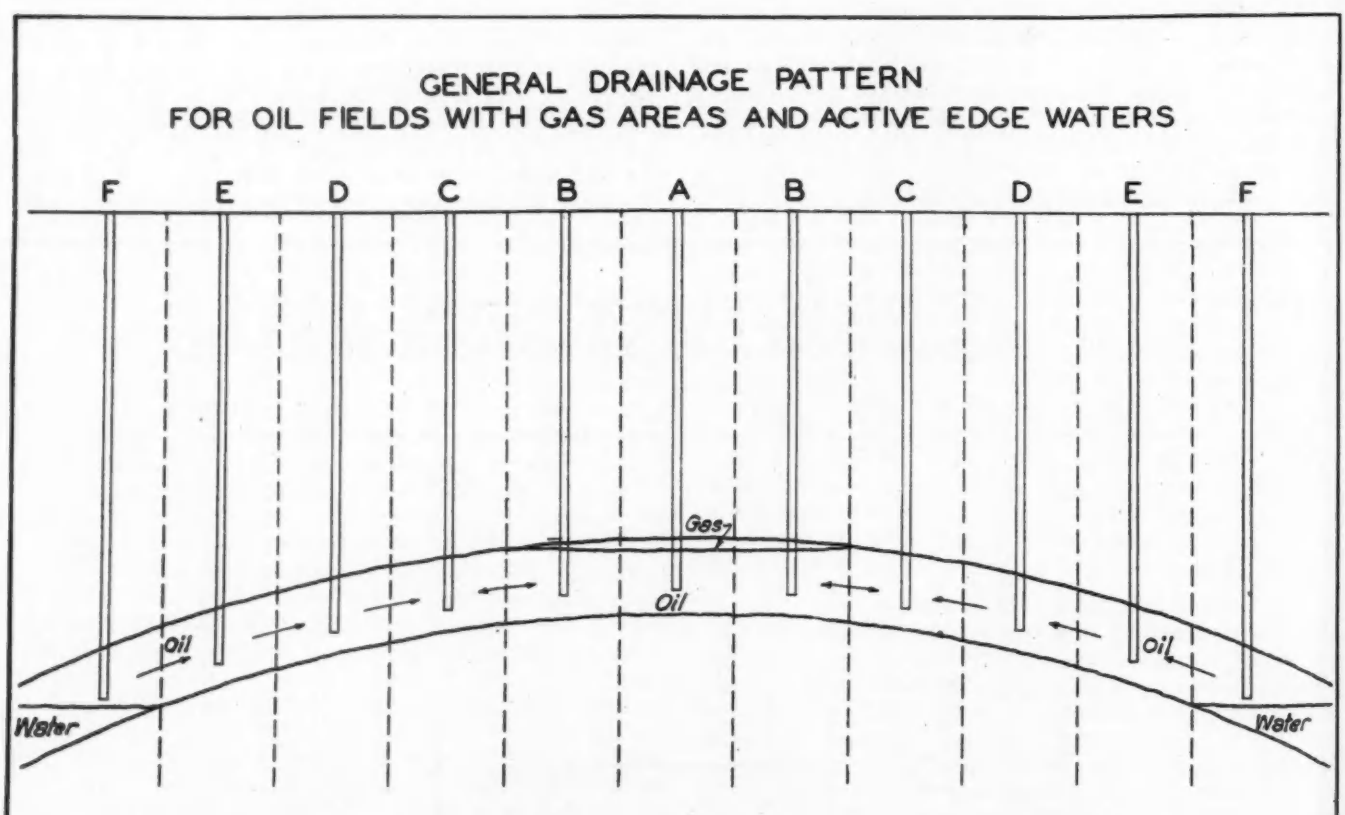


FIG. 3

With sand thickness, porosity, and permeability uniform, tracts "C", "D," and "E" originally have equal content of recoverable oil in place. As oil and gas are withdrawn from the pool, the water level rises, displacing oil from "E" to "D" and "D" to "C" etc. Therefore, if all wells are produced open or prorated by any uniform allowance system or by potential or acre feet, the leases "C" will recover more oil than leases "D," leases "D" recover more than leases "E" etc.

Waste of gas from "A" and "B" leases will accentuate this effect, but completely closing in the gas area will not modify the pattern.

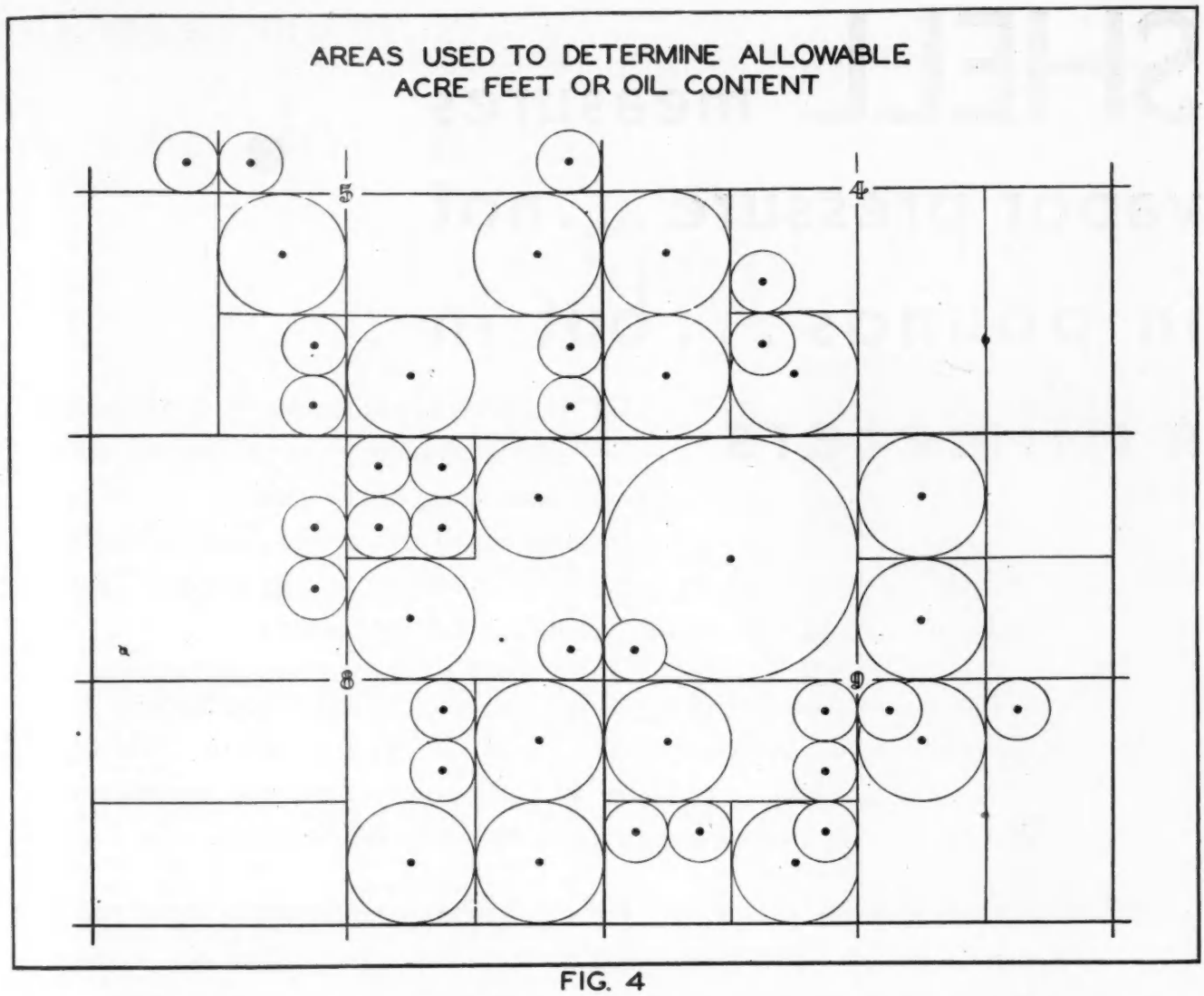


FIG. 4

longer capable of producing, the owner ceases to obtain any income from the property. Under common ownership of the pool, each participant shares until the exhaustion of the entire pool, regardless of the status of his formerly owned tract.

Because of the natural drainage trends outlined in the preceding discussion, a tract owner has a natural right to the profits resulting from any longevity of his tract, as compared to other tracts. A tract owner should also be entitled to any oil secured by the failure of another owner to promptly and properly protect his property by drilling. These two elements may somewhat complicate the legal interpretation of property rights but they are practical factors which can not be avoided unless enterprise, competition and chance are eliminated

The owner of tracts which must be closed in or restricted for conservation purposes, should be compensated for oil and gas lost by drainage and the deferred recovery of his remaining products. These damages can be determined with sufficient accuracy to satisfy the owner because of the stringency of present conservation laws if actively enforced. To deny compensation to the tract owner who closes in his property for the benefit of the pool, would be obviously unfair and illegal.

It is, therefore, suggested that the following standard of rights is suitable for allocating the production of oil pools.

1. Oil should be produced from tracts at a rate proportional to the total oil calculated to lie underneath the respective tracts, except in cases where the production of tracts is restricted to effect conservation of natural resources and the owner justly compensated therefor.

2. Oil produced from tracts prior to the completion or after the abandonment of wells on neighboring tracts should be the property of the party recovering the same.

This suggested standard will be of greater accuracy than our present proration systems and also establish a basis upon which unitization can proceed. In unitization projects where common ownership is desired, it will be necessary to evaluate the relative longevities of tracts while producing under the suggested system. No definite formula can be devised for such a determination and common ownership of oil properties will always be as much dependent upon the human element as any other merger of resources.

The practical application of this standard of rights in its simplest form is dependent upon uniform well spacing. In pools where development is incomplete, or well spacing is not uniform, the area used to determine oil content per well should be the area included within a circle drawn with the well as a center and the nearest property line or similar sized circle on the same lease as the radius limit. Cases of interference of circles can be determined as indicated upon Figure 4. The adoption of this modification will prevent unfair drainage under conditions of irregular well spacing and also promote wider and more uniform spacing patterns.

Conclusion

It is realized that the suggested system is not theoretically ideal, but it is believed to be equitable and practical and within the limits of accuracy obtainable from oil field data at reasonable expense. It is certainly superior to our present proration systems and is believed to be legally applicable as a standard of oil property rights.

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THE MECHANICS OF

Water Movement *in Natural and Artificial*

Flooding of Oil Sands

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THE attainment of efficient flooding to a large extent depends upon a knowledge of fluid movement through porous media and the pressures used in controlling this movement. Little has been understood concerning the fundamental principles involved in the forced drive of water flooding and an attempt will be made to present some data which may be of interest.

Considerable data and technical information pertaining to natural and artificial water flooding has been presented in the past by Torrey, Umpleby, Fettke, Panyity and others. Their papers have thoroughly covered the description of past and present day methods of oil recovery by flooding in the Bradford field, especially an article by Torrey[1] in the Petroleum Engineering Handbook. A bibliography of papers devoted to water flooding is published in Mr. Torrey's article. No attempt has been made, therefore, to describe the installations and procedure necessary in flooding, thus permitting the writer to deal exclusively with the mechanics of water movement in flooding operations and its relationship to well spacing.

Artificial water flooding will probably always be the most successful in oil fields described by Herold as being under Capillary Control[2] and will probably be useless in fields naturally under hydraulic or volumetric control. The natural water drive in an oil field under either of these two controls may give sufficient recoveries, as a result of the regulated encroachment of edge water. Such a "natural flood" resulting from the influence of edge water, must not be confused with the term as used in this paper, however. Any reference to "natural flood" will here refer to the old method of flooding formerly used in the Bradford field. This was discovered largely by accident and utilized the hydrostatic pressure created by a column of water standing in a watered out oil well in forcing the oil to an adjacent producing well. The same principles are involved in either natural or artificial flooding, and the latter method simply employs the use of pump pressure in forcing water into the sand through regularly spaced water-intake wells, instead of utilizing hydrostatic pressure alone.

The Forced Drive

In describing the forced drive Herold states: "We have learned that a natural reservoir of Hydraulic Control may become converted into one of Volumetric Control, and that one of Volumetric Control may become converted into one of either Hydraulic or Capillary Control. These conversions take place as a natural consequence of some factors that are within and other factors that are beyond our responsibility. Is it possible that a natural reservoir of Capillary Control might, as a consequence or factors beyond our responsibility, become converted into one of Volumetric Control? It is as likely to happen as a conversion from Volumetric to Capillary Control. Under given necessary conditions within the reservoir; namely, those with respect to the presence of both liquid and gas, and the porosity and texture of the formation, the failure of water to enter the formation from the surface will permit a conversion from Volumetric Control to Capillary Control, and its subsequent supply will permit a return to Volumetric Control. To convert—from Capillary Control to Volumetric Control it is only necessary to provide a pressure of sufficient intensity—to exceed the sum of all 'f's' (frictional effects)—and thereby force all globules and bubbles out at the orifice (well). So a subsequent supply of water from the surface might provide a pressure of sufficient intensity to exceed the sum of all the 'f's' within the formation and force all globules and bubbles out of the well, or wells.

"If Nature fails to do this on her own account, why should we not do it? It is true that we can scarcely hope to cause a conversion on such a grand scale as she can; nevertheless, if we are content to confine our efforts to short distances between wells, we should be able to exceed the sum of all the 'f's' between such wells by applying a pressure of sufficient intensity at one of them. There is no question about our ability to do this, for we easily recognize this process as the 'forced drive,' one that is already established in practice, and one that has already proved to be efficacious in fields of Capillary Control.

"We have observed that where Nature has established, and continues to maintain, the forced drive, as she has in

[1]Torrey, Paul D., "The Water Flooding of Oil Sands," Petroleum Engineering Handbook, Second Edition, 1931, Palmer Publications, Inc., Los Angeles, Calif., Pages 142-156.

[2]Herold, Stanley C., "Analytical Principles of the Production of Oil, Gas, and Water from Wells," Stanford University Press, 1928, Pages 9, 397, 567-584.

natural reservoirs of Hydraulic and Volumetric controls, there is little that we can do to help her. She drives with water, and if we are dissatisfied with the intensity of pressure at our wells, we can only seek an auxiliary supply of water at higher levels to be added to that already surrounding the pool. Lacking a copious and convenient supply we are helpless.

"There are differences—analytical differences—between a simple forced drive with the jamin capillary tube and the more complicated one with the productive formation. The movement of fluid in the former is confined to one direction by walls of solid material. These walls are absent in the latter. We shall prefer to say that the movement of fluid is here confined to a definite, localized area in the vicinity of the wells, these to be taken by pairs. At one of the wells the driving fluid enters the formation, and at the other the driven fluid is produced. If we like, we can call them the 'input' and 'output' wells, respectively."

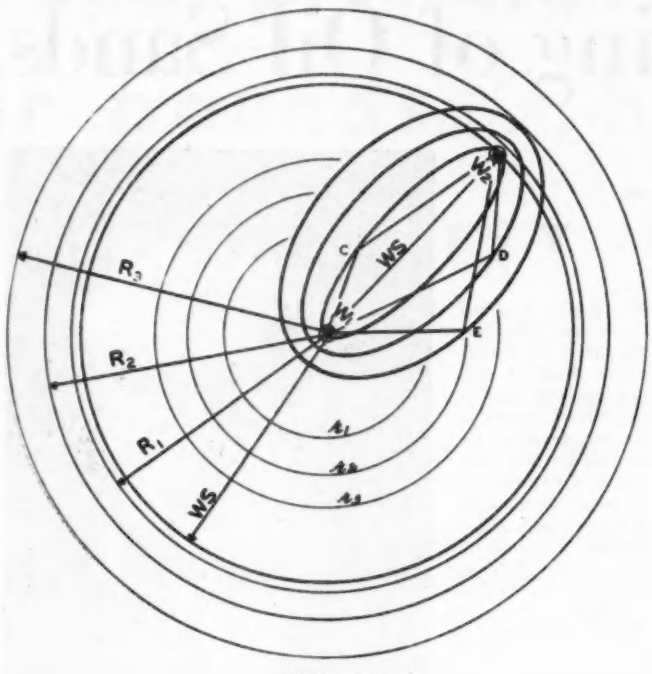

FIGURE 1

Showing relation between radius of pressure influence and size of ellipse

Zone of Flooding

To thoroughly understand the fundamental principles underlying either artificial or natural flooding, it is very necessary to study the geometrical shape of the flooded area between two wells. Herold was the first to study the shape of these localized areas, and because his interpretations are basic and descriptive of the natural physical influences controlling the movement of fluid within a porous medium, his material will be rather freely drawn upon.

Suppose we have a well, W_1, to use as an input well, and at a given distance, WS, from it a well, W_2, to use as an output, or producing oil well. If we imagine this oil well to be closed while we fill the intake well, W_1, with water under pressure, a cone of water is built up. This cone, let us say, has a radius, "r," in the early stages of the process. As the radius of this cone grows due to additional water being added, let us assume that it takes on a succession of values, r_1, r_2, r_3, and so on, until it eventually attains a value equal to WS. With continued growth it will exceed this amount, WS, reaching any prescribed value, R, such as R_1, R_2, R_3, and so on. The water within the area defined by the base of the cone is under stress, whether the radius be r, WS, or R. With the oil well undrilled, or tightly shut-in, none of the in-put water can flow from the formation, simply because there is no orifice from which it may escape. Inasmuch as there is an oil well at W_2 we might consider opening it from time to time during the process. As long as the radius has a value of "r," less than WS, the only fluid to be produced at W_2 is that due to the restoration of pressure within the reservoir.

If the input well, W_1, is closed and prevented from taking water under pressure, and the oil well, W_2, is opened, the zone under stress filled with water cannot be maintained over so great an area and the pressure within the formation declines.

Instead of closing the input well, W_1, we might continue to add fluid under pressure. If a pressure is maintained at this well we actually maintain a radius, R, of a certain value and this radius defines a circular area that is maintained under stress. No fluid can flow from the reservoir except that within the vicinity of the input well and the oil well. There is a restricted area here that will eventually be swept clean of the particular driven fluid, presumably oil.

The situation is shown in Figure 1. Assume that a certain pressure maintains a radius R_1, in excess of WS, the distance between the intake and outlet wells. R_1 we know to be the radius of action of this particular pressure being used. Assuming that WS, or the distance between wells, is drawn to scale, we may place pins at W_1 and W_2 and fasten to them a thread of length R_1, the radius of pressure influence on the same scale. Now we can say that the movement of the fluid within the formation is confined to all possible positions in which this thread may be imagined to extend between the two wells. In so far as this particular pressure being used is concerned, it can always move fluid over a path of length R. It, of course, can move fluid over a shorter path, but certainly it cannot move fluid over a longer one. But W_2, the oil well, is the only orifice within the distance R_1 from W_1. Therefore, the pressure used can only move fluid a distance of R_1, as this might be made to extend between the wells W_1 and W_2. If we take a pencil, and draw a closed area with it while it is held in the loop of the thread, we circumscribe the area to be swept out by P_1, the pressure being used. $W_1c + cW_2 = R_1$, and this is true irrespective of the position "c" on the circumference of the closed area.

As Herold states,—"this closed area is the maximum area of influence of the pressure, P_1, which was used. The manner in which we have drawn it, and its simple geometrical properties establish the fact that it is an ellipse. The two wells are at its foci. So long as we manipulate one well, either on filling or on producing, we are concerned with true circular areas with a unique center, but as soon as we manipulate wells in pairs, as we have in the present instance, we are concerned with 'such circular areas which possess two centers;' namely, the ellipse. The change from the circle to the ellipse is inevitable under the circumstances.

"We can cause a conversion of control to take place, but nature restricts us to a localized area. During an intermittent process where W_1, the intake well, is first opened for filling and then closed while W_2, the oil well, is opened for production, the control is Volumetric. Once that we have this control we can cause a further conversion to Hydraulic Control, as in the continuous process just described."

Present day water flooding, as practiced in the Bradford field, under the continuous process of filling water-intake wells and maintaining water pressure, constitutes a conversion to Hydraulic control. The old conception of fluid movement within the producing sand, and the one which still exists to a large extent, is that the water from an intake well travels between wells in a zone of movement circular in form; when as a matter of fact, it has been shown and is definitely known that where wells are operated in pairs, the zone of recovery

is elliptical in shape. Circles can exist only where the oil well is not open for production.

In referring again to Figure 1, assume that P_1 is a critical pressure equal to the sum of all the "f's," WS or resistances to fluid movement in the sand, between W_1, the intake well, and W_2, the oil well. The forced drive cannot exist unless the pressure being used exceeds this critical pressure. Herold states that this means the ellipse between the wells must have a minor axis greater than zero. If the minor axis is of zero length, there is no ellipse, and instead, the ellipse is represented simply by the straight line between the wells, a line corresponding to a radius equal to, but not exceeding WS, the distance between wells. This is another way of saying that, in flooding operations, if a pressure is not used which is greater than the pressure represented by the frictional resistance effects in the sand between the two wells, there can be no flooding action between the wells.

If a pressure is maintained at the intake well greater than P_1, or greater than the distance, WS, between wells, such as would be graphically represented by R_1 in Figure 1, the ellipse is defined by $W_1c + cW_2$, which in length, graphically is equal to R_1. If a pressure is maintained still greater than WS, such as would be represented by R_2, the ellipse is defined by $W_1d + dW_2 = R_2$. Again, if a pressure equivalent to R_3 is used at the intake well, the ellpise is defined by $W_1e + eW_2 = R_3$.

A short study of these relationships will make it clear that the ellipses possess areas which depend upon the intensity of the pressure applied at the input well, so long as the constant back pressure at the outlet well is not changed during the process. The ellipses in Figure 1 are based upon the assumption that the formation is perfectly homogenous in texture and fluid from top to bottom. Such ideal conditions are never found, however, and if there are strata of different permeabilities or texture, there may be more than one ellipse existing simultaneously between the two wells.

Properties of the Ellipse

It can now be inferred that the distance between the water intake and oil wells, or in other words the spacing used in flooding, is directly related to the ellipse. To further understand the factors which control spacing, it is necessary to know something concerning the ellipse itself. A few important relationships will be briefly described. Figure 2 shows a true ellipse drawn around two imaginary wells, W_1, an intake water well, and W_2, a producing oil well. If a line, such as "b," is drawn vertical to WS, exactly half way between W_1 and W_2, then

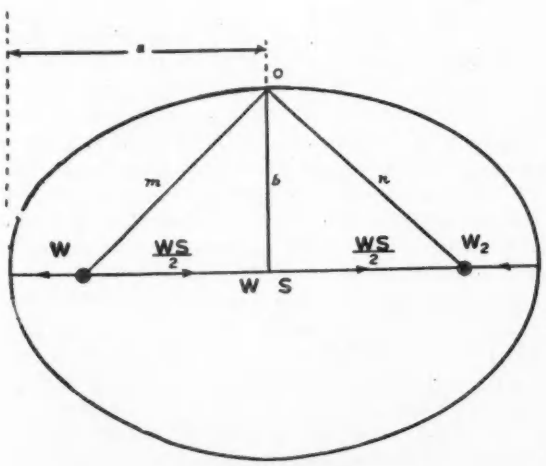

FIGURE 2

Showing relationship between axes of the ellipse

$$m = n = a$$

where "a" is one half of the major axis of the ellipse; and "b" is equal to one half the minor axis of the ellipse. The area of the ellipse is, as given by geometry, equal to:

$$\pi \; a \; b$$

Figure 3 shows an imaginary "five-spot" with the four water intake wells and the oil well in the center, with an ellipse drawn between one of the intake water wells and the central oil well. It is assumed that the required pressure has been used to create an ellipse of sufficient width in minor axis to cause its circumference to intersect the line between two of the water wells at exactly the half-way point, so that it would contact the adjacent ellipse drawn from the other water well in the same manner. The intersection of all four ellipses controlled by the four water wells, at the half-way points between, would completely cover the five-spot area. When such intersections are secured, it is evident that the long axis, "x," of the ellipse is equal to the distance between two adjacent water-intake wells; and the minor axis, "y," is equal to the distance between the oil well and a water-intake well. In other words, the size of the ellipse which will give complete coverage of its share of the five-spot, has a long axis equal to the distance between water wells and a short axis equal to the space between oil and water wells.

In a square, the diagonal is equal to the product of one of the sides multiplied by the square root of 2. In Figure 3 let

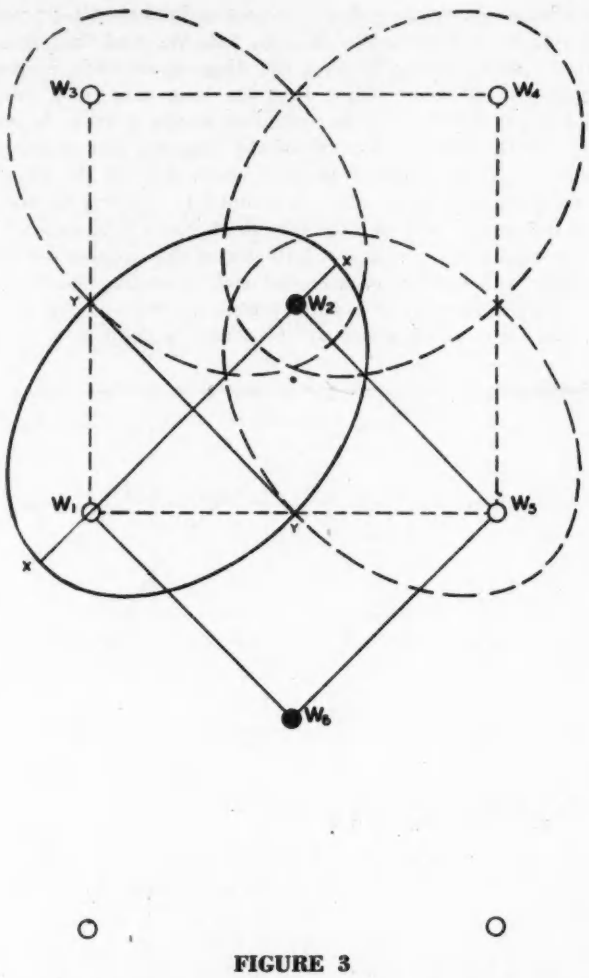

FIGURE 3

Ellipses as they would appear under ideal conditions where sufficient pressure has been used to give five-spot coverage.

the distance from the oil well to water-intake well represent the side of a square, W_1, W_2, W_3 and W_4, and the distance between water wells, W_1—W_2, the diagonal of such a square. It has already been shown that the long axis of a proper sized ellipse for flooding is equivalent to the distance between water wells, or the equivalent of the diagonal just mentioned. Therefore, if an ellipse is desired which will fill the requirements along with three others in completely covering the square of a five-spot, it will be necessary to choose a long axis which is the square root of 2, or 1.414 times the distance between an input well and the adjacent oil well. Carrying the illustration a little further, if a pin is placed at the location of the oil well, and another one at the water well, with a thread

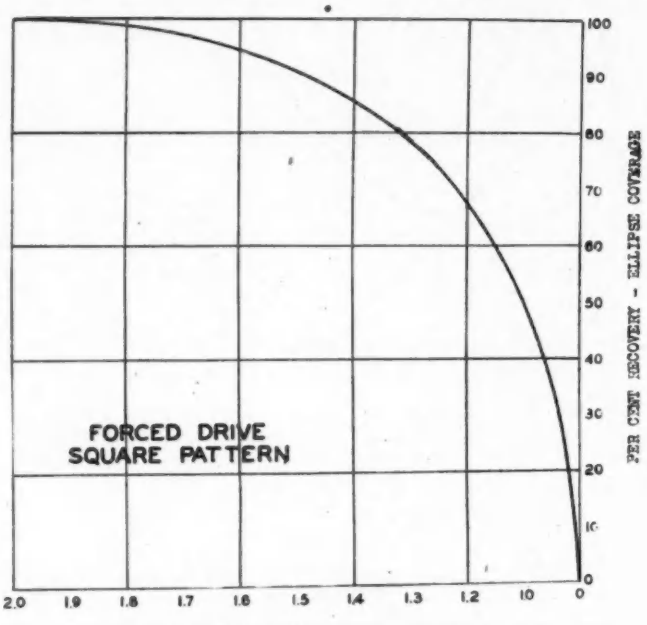

FIGURE 4

Relationship between size of ellipse and pressure (after Herold)

exactly 1.414 times as long as this distance tied between the two, a pencil drawn within the loop of the thread so that the thread is always taut, will circumscribe an area which is a perfect ellipse.

Applying the principle to practice, it would seem that if we know the "f's" or frictional resistance offered by the sandstone of the oil producing horizon between a water intake well and an oil well, it would be possible to convert this to terms of pressure, and then multiply this pressure resistance by the factor of 1.414 to determine the pressure which must be applied on the sand face to create an elliptical zone of fluid movement, or stress, which would give complete areal coverage of the five-spot by all four ellipses which "feed" the oil well.

Where such knowledge of pressures is had, it is possible to determine the flooding pressure necessary, but the factor of 1.414 of lineal and tubular flow, in the graphical interpretation, does not represent the exact order of things in a radial system. Natural reservoir systems are radial. Flow takes place within them in all possible directions about the well as a center. In a linear or tubular system, the radius of pressure action will vary directly as the pressure, as indicated in the discussion of Figure 1, but in a radial system the radius of pressure action cannot, as Herold says, keep pace with the pressure, while the latter is increased, for the reason that as the number of resistant forces, "f," along any radius is increased, that along the corresponding circumference is also increased. The increasing number of pores brought into play by the increase of the radius, takes an increasing amount of the fluids without a directly corresponding increase in the number of "f's" to offset the pressure. In other words, in a radial system the radius depends upon the square foot of the value of the pressure. To double the radius in a process of filling, the pressure must attain four times the value; to treble the radius, the pressure must attain nine times the value; to give a radius 1.414 times the value, which is necessary for the desired ellipse, the pressure must attain twice the value. Expressed in still another way, the pressure varies as the square of the radius.

Therefore, to secure the proper size ellipse for complete five-spot coverage, a pressure twice the value of the "f's" or the frictional resistance between water well and oil well must be used. Herold presents on Page 583 of his treatise, a curve which shows the amount of coverage in a square pattern which is theoretically possible for any pressure value. Twice the value of pressure equivalent to the frictional resistance, gives 100 per cent coverage. A pressure on the sand face 1.6 times the resistance gives approximately 94 per cent coverage. Practically speaking, this is sufficient, as the additional effort to acquire the remaining six per cent in coverage necessitates the expenditure of 40 per cent more pump pressure, which may be uneconomical due to the additional cost of high pressure equipment. Figure 4 gives the Herold curve in a modified form.

Application of Ellipse Theory in Flooding

It will now be apparent that if knowledge is had concerning the frictional resistance to the flow of fluid which is offered by the producing horizon, it should be possible to tie-in or correlate spacing with the pressures available for flooding. A measure of the ability of a porous medium, such as an oil sand, to take water is a unit of some measure of its permeability. At the present time there is not enough data available on the permeability of the Bradford sand. Several research agencies have given some study to permeability, but the results have usually been expressed in terms of linear or tubular flow, and these permeability factors are not readily adapted to problems in radial flow.

Pending receipt of more accurate determinations of sand permeabilities in terms of the amount of pressure necessary to force various amounts of water through the Bradford sand, the writer has utilized water-intake, pressure, and production records on various leases in an effort to determine what pressure resistance is offered by the sand for various well spacings. When a new flood is drilled and put under water pressure, it is some time before there is any appreciable production of oil from the oil well, the daily amount not exceeding a few quarts or gallons. When the production records show the first definite increase in oil production, the pressure records are consulted for that time and the pressure which exists at the face of the sand is computed. This simply consists of the hydrostatic pressure of the column of water in the intake wells, plus the pump pressure supplied at the water pressure plant. Knowing that the pressure in existence at the sand face is approximately that which has overcome all the frictional effects in the sand between the water-intake well and the oil well, it is divided by the distance in feet between the two wells to secure a factor called "frictional resistance per lateral foot." The average water intake per day per well for this critical pressure on properties of the Forest Oil Corporation in the Bradford field has been approximately 20 barrels. For this amount of water intake the pressure drop or frictional resistance varies from 4.0 to 9.0 per square inch per lateral foot.

On one lease where some experiments with flowing wells were carried out, a water intake well was under a pump pressure of 810 pounds per square inch. With the Bradford sand lying at a depth of 1129 feet, there was a total pressure at the top of the sand of 1299 pounds per square inch. One hun-

dred seventy-five feet away is an oil well with the sand at a depth of 1211 feet. This well equipped with two-inch tubing, started to flow when the pressure at the intake well was 810 pounds. The column of oil in the oil well exerted a pressure of 427 pounds per square inch against the sand face. The pressure drop or frictional resistance across the 175 feet of Bradford sand was, therefore, 1299 — 427 or 872 pounds. This is equivalent to 4.98 pounds per lateral foot.

On still another lease, where the intake water wells have an average depth of 1196 feet, it was noticed in studying the production and pressure records of the flood that when the first real increase in production from the oil wells was secured, the pump pressure at the top of the intake wells was 311 pounds per square inch. This would give a pressure of 828 pounds per square inch at the top of the sand. In other words, a total pressure of 828 pounds per square inch was necessary to overcome the sand resistance in the 177 feet of sand lying between the water-intake and oil wells. This is equivalent to 4.67 pounds per lateral foot.

Table 1 gives some pressure data from several leases or floods.

TABLE 1
Pressure Resistance Data on Several Leases

Flood	Distance Water to Oil	Average Well Depth	Hydrostatic Pressure	Pump Pressure Used When Sand Resistance Was Overcome	Total Pressure Drop Through Sand	Pounds Pressure Drop Per Lateral Ft.
A	150	1300	563	250	813	5.42
B	175	1045	452	362	814	4.65
C	200	1549	671	250	867	4.33
D	230	1362	590	462	1052	4.57
E	177	1417	613	262	875	4.94
F	140	1805	781	476	1257	8.97
G	180	1723	746	549	1295	7.19
H	170	1698	735	205	940	5.52
I	142	1267	550	1000	1550	10.91

If, for example, frictional resistance for a 20-barrel intake is 5.0 pounds per lateral foot, and the spacing is 200 feet between oil and water-intake wells, then the total resistance offered by the sand is 200 times 5, or 1000 pounds per square inch. Using an ellipse coverage factor of 1.6, the pressure at the sand face of the intake-well should be 1.6 times 1000, or 1600 pounds per square inch in order to secure the maximum, practical, recoverable amount of oil from the individual five-spot. If the intake well is 1000 feet deep, the natural pressure resulting from the column of water in the well is 433 pounds, which would leave 1167 pounds pressure to be applied by the pumps at the pressure plant.

A formula for radial flow of dead fluids, used by engineers of the Gulf Oil Corporation* has been found adaptable to flooding problems. This formula incorporates the use of a permeability factor derived experimentally by laboratory test of a sample of the oil sand. The formula is as follows:

$$Q = \frac{2\pi k\, t\, (P_1 - P_w)}{\log_e \frac{r_1}{r_w}}$$

Where:
- Q = cubic centimeters of liquid per second
- k = Permeability in cc/ sec/ cm²/ atoms. pressure/cm.
- t = sand thickness in centimeters.
- P_w = Pressure at sand face in atmospheres.
- P_1 = Reservoir pressure in atmospheres.
- r_1 = radius of outer boundary of drive.
- r_w = well radius.

This formula can be expressed in terms of pressure drop across the radius of drive as follows:

$$P_w - P_1 = \frac{Q}{k \times t \times \frac{2\pi}{\log_e \frac{r_1}{r_w}}}$$

Simplifying the formula, the writer has expressed it in terms of more convenient factors. It now becomes:

$$Pd = \frac{Q \times \log_e \frac{Rd}{R_w}}{k \times t \times 7.08}$$

Where:
- Q = Volume of fluid intake, barrels per day.
- k = Permeability factor (cc/sec/cm²/atoms./cm)
- t = Sand thickness, in feet
- Pd = Pressure drop across drainage radius from well in pounds per square inch
- Rd = Drainage radius from well in feet
- R_w = Radius of well bore, in feet.

Laboratory tests of small chunks of Bradford sand show the average permeability to be approximately 0.000579 (cc/sec./cm²/ atoms./cm). Using this factor (k), and substituting in the equation the following values from two wells the writer has worked with: $Q = 20$ barrels per day; $t = 48$ feet; $Rd = 175$ feet; and $R_w = .25$ feet, the value given by solving the equation for pressure drop, Pd, was found to be 917 pounds or 5.09 pounds per lateral foot, which is a pretty close check of the method for computing the frictional resistance per lateral foot based upon pressure and production records.

Table 2 gives the pressure drops for various volumes of fluid, using the values of "k," "t" and "R_w" as before.

The values for "pressure drop" in Table 2 indicate that there is a linear or straight line relationship between pressure and in-

* Through courtesy of R. D. Wyckoff, Gulf Research Laboratories, Pittsburgh, Pa.

TABLE 2
Pressure Drop—Pounds Per Square Inch

Vol. of Fluid Bbls. Per Day	Radius of Flow in Feet									
	25	50	75	100	150	200	250	300	350	400
5	117.06	134.67	144.98	152.30	162.60	169.91	175.69	180.22	184.14	187.53
10	234.12	269.34	289.96	304.60	325.20	339.82	351.18	360.44	368.28	375.06
15	351.18	404.01	434.94	456.90	487.80	500.75	526.77	540.66	552.42	562.59
20	468.24	538.68	579.92	609.20	650.40	679.64	702.36	720.88	736.56	750.12
25	585.30	673.35	724.90	761.50	813.00	849.55	877.95	901.10	920.70	937.65
30	702.36	808.02	869.88	913.80	975.60	1019.46	1053.54	1081.32	1104.84	1125.18
35	819.42	942.69	1014.86	1066.10	1138.20	1189.37	1229.13	1261.54	1288.98	1312.71
40	936.48	1077.36	1159.84	1218.40	1300.80	1359.28	1404.72	1441.76	1473.12	1500.24
45	1053.54	1212.03	1304.82	1370.70	1463.40	1529.19	1580.31	1621.98	1657.26	1687.77
50	1170.60	1346.70	1449.80	1523.00	1626.00	1699.10	1755.90	1802.20	1841.40	1875.30
55	1287.66	1481.37	1594.78	1675.30	1788.60	1859.01	1931.49	1982.42	2025.54	2062.83
60	1404.72	1616.04	1739.76	1827.60	1951.20	2038.92	2107.08	2162.64	2209.68	2250.36
65	1521.78	1750.71	1884.74	1979.90	2113.80	2208.83	2282.67	2342.86	2393.82	2437.89
70	1638.84	1885.38	2029.72	2132.20	2276.40	2378.74	2458.26	2523.08	2577.96	2625.42
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put volume for any given radius. If the volume of intake through a given radius is doubled, the pressure drop is doubled, and so on. The amount of increase in pressure drop declines as the radius increases, and it is interesting to note that for a five-barrel input, for example, there is a total pressure drop of 169.91 pounds per square inch in 200 feet. Sixty-eight and eight-tenths per cent, or 117.06 pounds of this, occurs within the first 25 feet of sand adjacent to the well, as a result of the increased velocity of flow in this area.

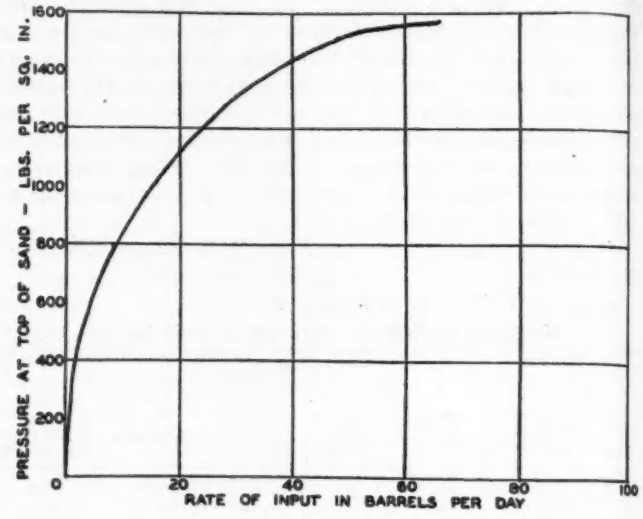

FIGURE 5

Curve showing water intake for the Bradford sand at various pressures.

In actual performance the pressure-input curve is not linear, but similar to that shown in Figure 5. There are several theories which may account for this, but these will not be discussed in this paper.

With knowledge of the amount of resistance to fluid movement the sand will offer at any locality, we have all the data necessary for use in arriving at some decision concerning the spacing between wells. A simple formula has been prepared which gives the relationship between the various factors and the distance between oil and water wells. This formula is as follows:

$$D = \frac{P_1 + P_2 - P_b}{f \times 1.6}$$

Where,

D = Distance in feet between water intake and oil well.

P_1 = Pump pressure available at head of intake well; pounds per square inch.

P_2 = Hydrostatic pressure on sand in water intake well; pounds per square inch.

P_b = Any back pressure which might exist on sand in oil well; pounds per square inch.

f = Frictional resistance per lateral foot offered by sand; pounds per square inch.

In terms of P_1, the pump pressure which should be available for use at the top of the water-intake well, the formula is as follows:

$$P_1 = (D \times f \times 1.6) - P_2 + P_b$$

Well spacing in the forced drive, or water flood, should always be expressed in terms of the distance between "water and oil wells," instead of "water to water," such as generally used. The latter reference is misleading, and may lead to an erroneous conception concerning spacing in water flood recovery. The distance between the oil wells and their controlling

water wells in any type of spacing pattern, is the critical distance with which we are concerned in flooding operations. It is the distance through which the oil must be moved in the sand before it can be produced.

Relationship Between the Ellipse and Production Curve

Although it is definitely known that the zone of flood between wells is elliptical in shape, and that such an arrangement is satisfied by the physical and mathematical laws governing such movement, it is interesting to know that the ordinary production curve of a flood well, or the curve from a group of wells on a lease, is definitely related to this elliptical zone of fluid movement, and helps substantiate the ellipse theory. Where several five-spots are laid out side by side in developing a lease for flooding, such as shown by Figure 6, one intake-water well has radiating from it as many ellipses as there are nearby oil wells. Usually each intake well has four ellipses. As a result of these being adjacent to one another, there is interference between them. Each ellipse receives one-fourth of the water pumped into the intake well, but this water cannot travel over into the zone of movement of the adjacent ellipse any farther than the side of the square five-spot. In adjacent ellipses, providing they are of the proper size for five-spot coverage, this interference confines the movement of fluid to a

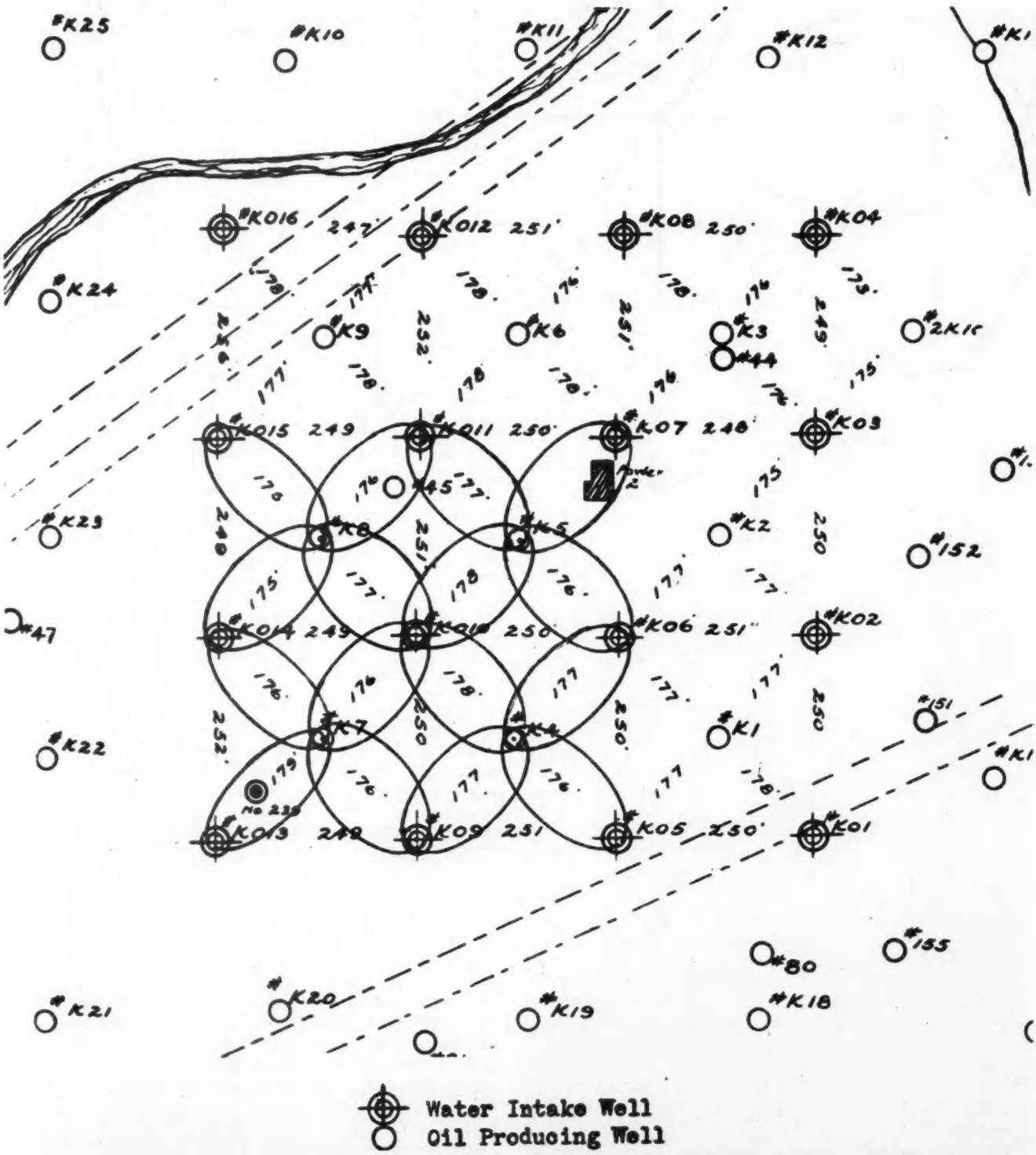

FIGURE 6

Map of small five-spot flood, with a few ellipses drawn as approximately defined by pressure used.

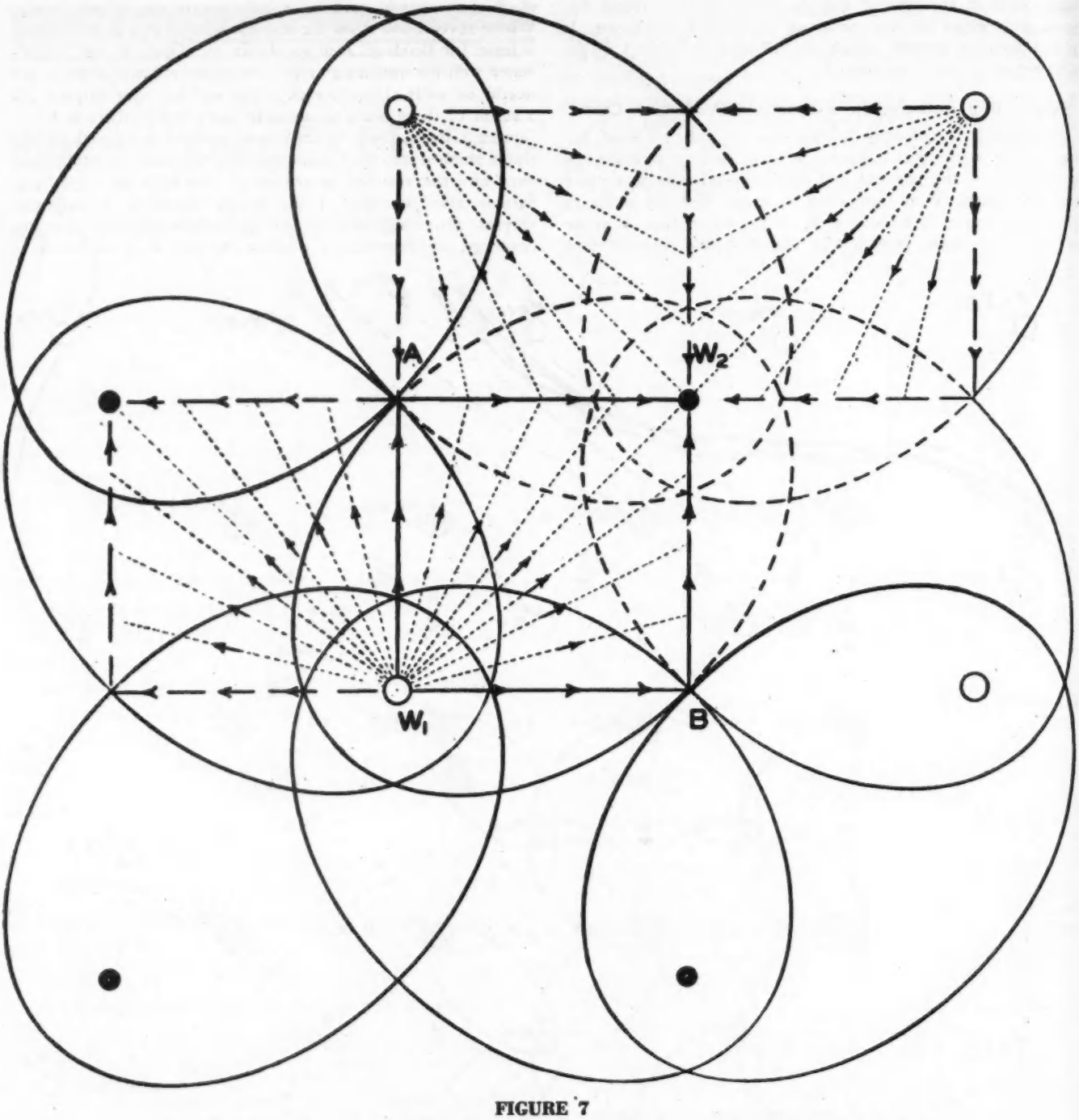

FIGURE 7

Showing zone of flood between wells to be a square or "diamond" within an ellipse, due to interference.

square "diamond" shaped area within the ellipse, with the long axis of the "diamond" consisting of an imaginary line drawn between the intake well and the oil well. This situation is shown by Figure 7, where W_1 is an intake well and W_2 is an oil well. One of the squares or "diamonds" feeding the oil well is represented by W_1, A, W_2, B. In other words, each ellipse gives up an equal share of fluid to its neighbor, and assists it in the fluid drive. If the ellipses are too narrow to give complete coverage, the zone of flooding is approximately that of a rhombohedron within an ellipse. In this present discussion, however, attention will be confined to the diamond shaped figure.

The width of the diamond or square within the ellipse, of course, is dependent upon the width or length of the minor axis of the ellipse; which in turn is dependent upon the flooding pressure which has been used in establishing the dimensions of the individual ellipses. Although the fluid movement, or zone of stress, is now seen to lie within a diamond inside of an ellipse, nevertheless the distribution of fluid away from the bottom of the intake well is controlled by the laws of radial flow, and for this reason advances in a radial or circular movement within the diamond. Theoretically, the face or bank of driving fluid, as it lies in contact with the oil or driven fluid, is similar to the outside face of a cylinder. As driving fluid is admitted to the intake well under pressure, this curved face of water-oil contact advances in the direction of the oil well. The rate of advance is dependent upon the amount of fluid entering the sand at the bottom of the intake well.

Assume for the sake of illustration, that we have a diamond-shaped tank within an ellipse frame standing upon end, as

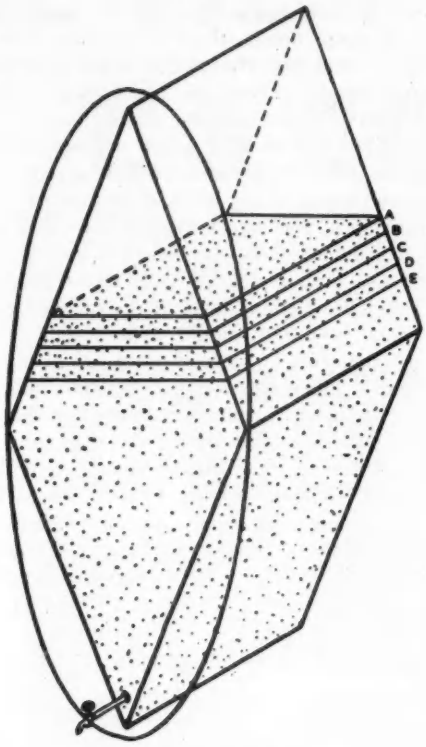

FIGURE 8

Diamond shaped tank showing fluid levels after successive withdrawals.

shown in Figure 8. At the lower part of the tank we have a valve controlling an outlet which ejects fluid when opened. Suppose that we open this valve at repeated intervals, so that at each withdrawal the fluid level within the diamond-shaped tank is lowered exactly one inch. The amounts of fluid withdrawn, represented by the successive fluid levels, a, b, c, d, etc., naturally increase in volume until the wide part of the diamond is reached, when they decrease. If the diamond shaped tank is, for example, 36 inches long, 14 inches wide and 12 inches thick, the amount of fluid withdrawn through the valve each time it is opened until completely drained, would give a curve such as shown by Figure 9 when plotted on coordinate paper.

This curve has the symmetry and characteristics given it by the equal, lineal rate of withdrawal. In a water drive or flood, however, the lineal rate of water travel is irregular and declines instead of becomes constant which govern the tank in Figure 8, govern the sand body or "tank" between an intake well and the oil well. A constant intake at the water well will give decreasing increments of fluid movement; and constant values of increment in turn call for increased intake. In an oil sand, the pore space is not completely filled with oil or fluid, and there are voids which have to be filled with the driving fluid before an outlet or production of oil can be secured at the oil well. As a result, when water is admitted to the intake there is not an immediate response with production of oil at the oil well. The time between the admission of water and production of oil is dependent upon the thickness and porosity of the oil sand, its saturation, and the amount of water which is being pumped into the sand.

On a certain lease of Forest Oil Corporation, where the spacing between oil and water wells is 177 feet, the pressure in use had theoretically defined an ellipse with a major axis 201 feet in length and 97 feet wide. The effective sand has a thickness of 42 feet, a porosity of 14.0 per cent, and a saturation of 65 per cent. Estimating a possible recovery of 30 per cent, calculations were made as to the radius of the encroaching water circle within the diamond of the ellipse at the end of each month since the beginning of the flood, using the actual amounts of water which were introduced into the sand, and allowing for loss in unfilled pore space. The first increase in production from the oil wells was noticed in December, 1928, after the water was first introduced into the intake wells a few months previous. Knowing that the sand between the intake wells and oil wells had to be "loaded" with fluid before there could be any appreciable production of oil from the oil wells, it is known approximately where the "bank" of oil was assembled and started moving from.

Figure 10 shows a plan of one ellipse of this flood, the line A-B represents the position of this so-called "bank." Successive monthly positions of this bank, as it advanced on the oil well, are shown by the numbered segments. The situation existing here is comparable to that which existed in the tank previously discussed. Every month of travel in the water bank is represented by a month's production of oil from the oil well, equivalent to the amount of oil displaced from that sand segment with the porosity, saturation, and thickness mentioned. Each oil well is fed by four ellipses, so the amount of fluid represented by each monthly segment, multiplied by four, should approximately equal the monthly production of an individual oil well.

The theoretical production curve plotted from the production which should have been given by the various segments of the diamond within the ellipse represented in Figure 10, is shown in Figure 11. The actual average well production curve of this flood is shown beneath it. It may be seen that the two curves are quite similar, and they should be, providing there has not been excessive by-passing of water through more permeable streaks of sand. In the theoretical production curve, there is frequently no sustained production at a low rate, such as found in actual production curves. The writer believes that such

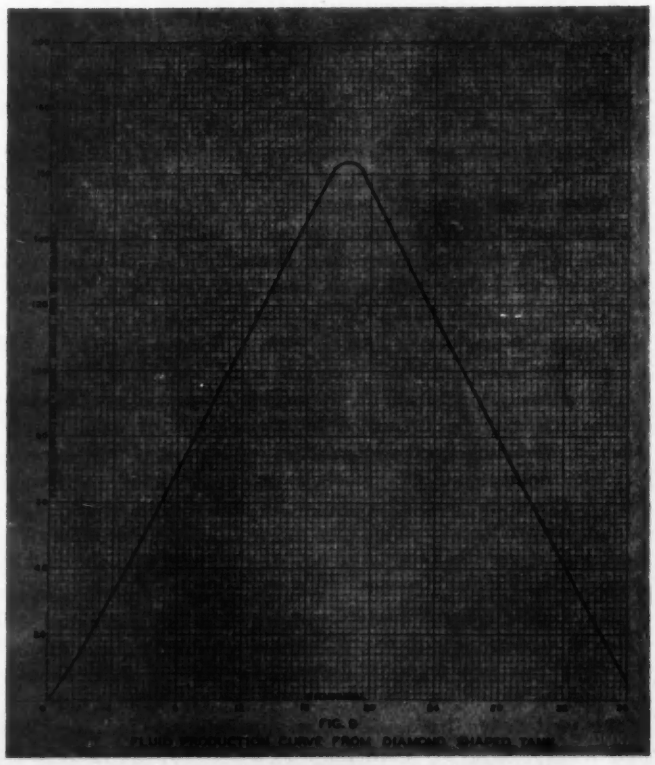

FIGURE 9

Fluid production curve from diamond shaped tank

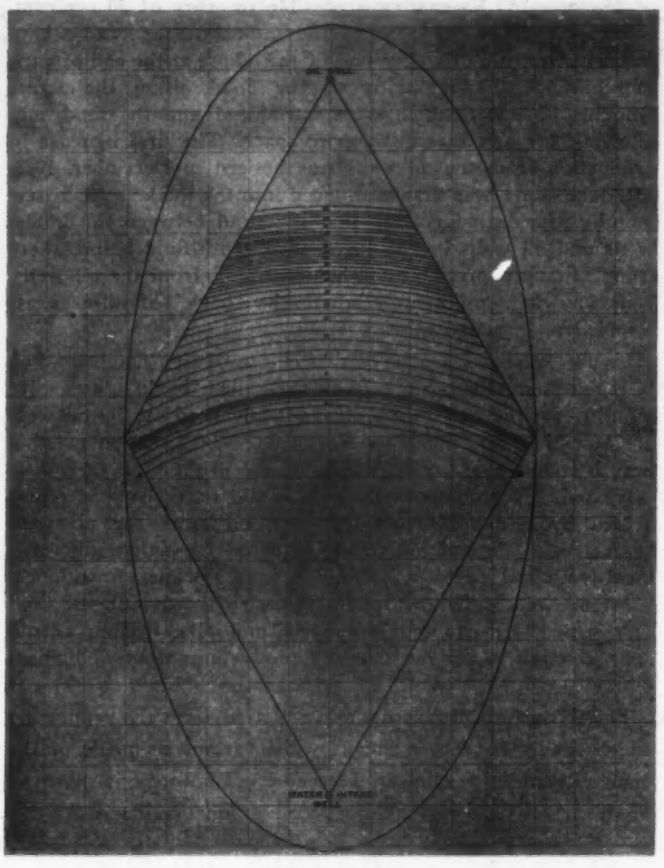

FIGURE 10

Ellipse diagram showing calculated successive monthly positions of water bank. The basis for estimated curve in Figure 11

sustained curves are due to a continued flushing or "chiseling" action of the encroaching water bank in removing small quantities of oil from the sides of the diamond after the major quota of production has been removed and produced.

Of course, the entire previous discussion has been based upon the assumption that the flood is 100 per cent efficient, and that the sand body is entirely homogeneous throughout. Such perfect conditions are very rarely found, but nevertheless such deviations from a perfect performance do not destroy the fundamental principles which have been outlined. Actually, we may have several beds of sandstone within the producing horizon with different porosities, permeabilities, etc., but the theory of the ellipse still holds and there will be a different size ellipse for each sand of different permeability.

A study of production curves from a flood will yield a lot of valuable information, providing some knowledge is also had of porosities, saturations, permeabilities and other physical data which may be furnished by an analysis of sand cores. When a producing flood well reaches its peak, it is now known that the flood bank has reached the approximate half-way point between the intake water wells and the oil wells. The amount of production yielded by the well at its peak may give some hint concerning the efficiency of the flood and the width of the ellipse which has been formed.

In hydraulic control fluid is withdrawn at the same rate at which it is introduced. On this basis, in flooding operations the fluid (oil and water) produced by the oil wells should be equal in volume to the amount of water pumped into the intake wells. We have seen that four ellipses feed one oil well in a five-spot; or in other words, one-fourth of the volume of water introduced into each water-intake well should find its way toward the oil well. This is equivalent to saying that the water-intake of one well is equal to the output of fluid at the oil well. In some floods, there is a fairly close balance between input of fluid and the output from producing wells, but usually one would expect an intake in excess of fluid production, due to the fact that there are void spaces in the unsaturated portions of the sand which are unavoidably filled with fluid as the drive progresses. It is believed that this is generally true, although there is little data available, due to the fact that most of the water produced along with the oil from a well is siphoned from the well receiver without being gauged. Once the sand is loaded with either oil or driving fluid (water) and production starts at the oil well, subsequent amounts of fluid produced should approximately equal the amount put into the sand. If there is no excess of input fluid in comparison to that taken out this may indicate that the sand was already loaded with connate water, or that there is some highly permeable streak of sand which is permitting the input water to gain immediate exit through the oil well. Figure 12 shows the production curve of an oil well where the water increases as the amount of oil production declines, the total volume of fluid produced, however, remains almost constant, as would be expected in hydraulic control with a more or less constant intake.

Pressure Gradient

Every producing oil well usually has what is called a kinetic pressure gradient within the producing sand, lying in a radial position around the well. This gradient defines the limits of a zone within which there has been some change or diminution of pressure. Such an imaginary gradient is shown by the line A-B in Figure 13. These gradients are established especially in wells which are producing or flowing as a result of gas or hydrostatic pressure, or both. In flood wells, however, the gradient is not so pronounced, due to the fact that the rate of production is not large and the sand is fairly "tight." Nevertheless, such a gradient exists, and it can be imagined as

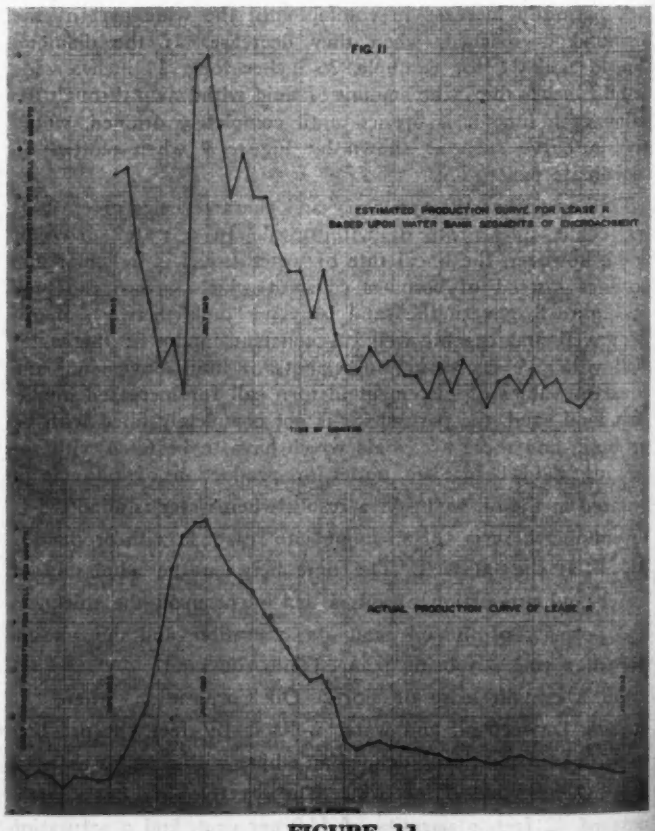

FIGURE 11

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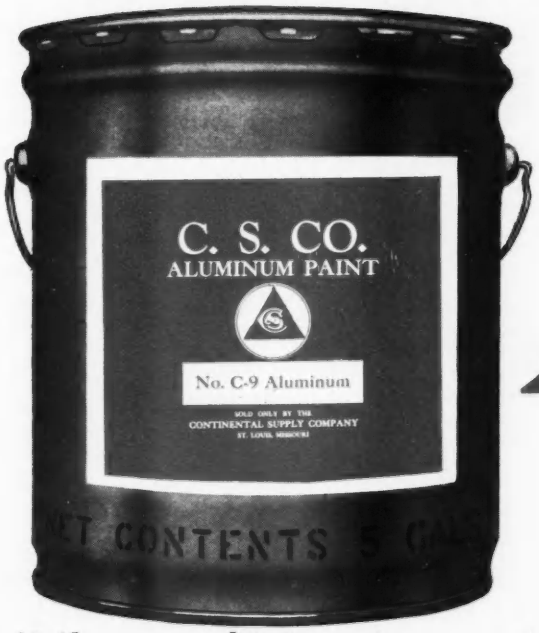

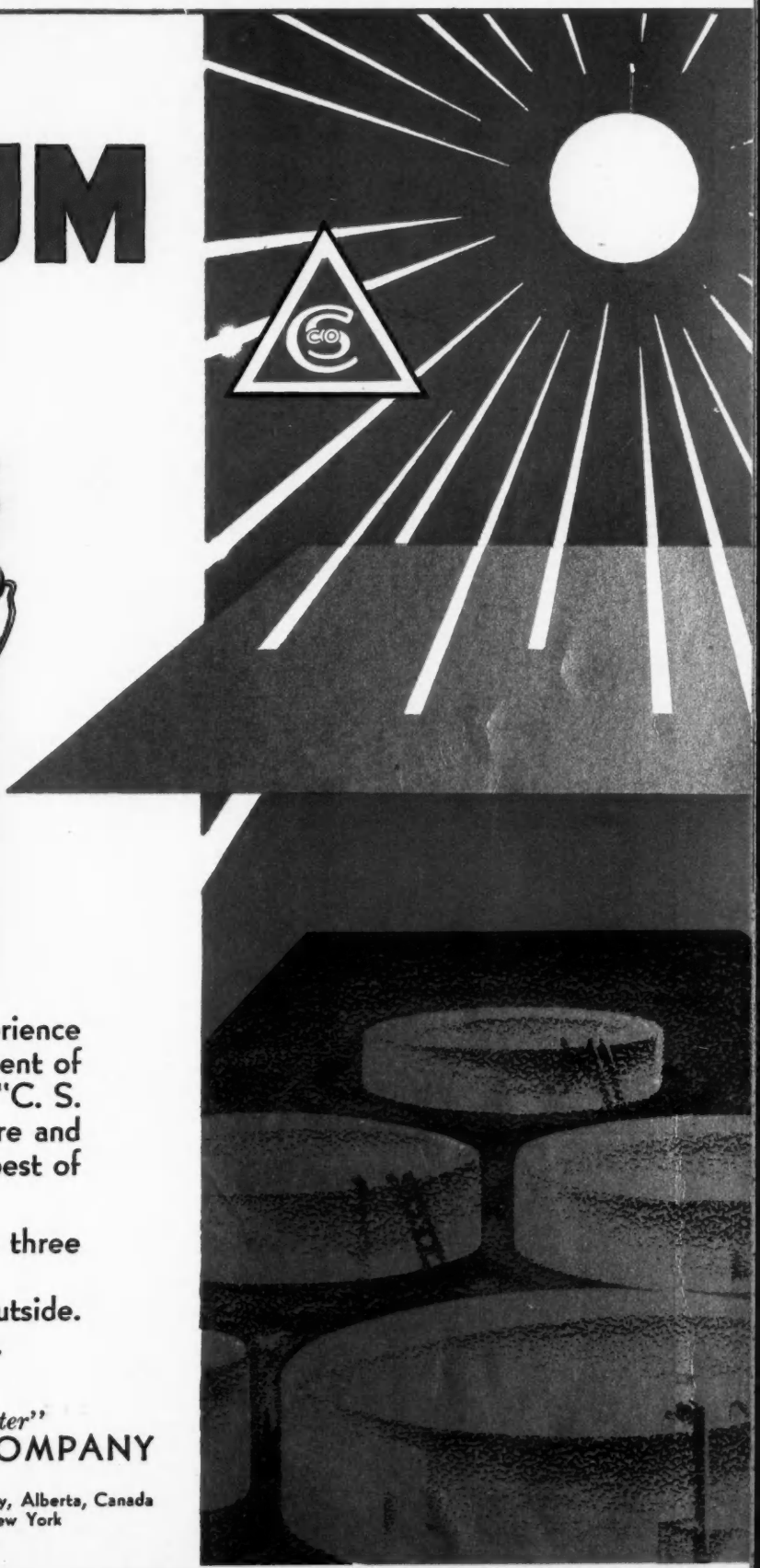

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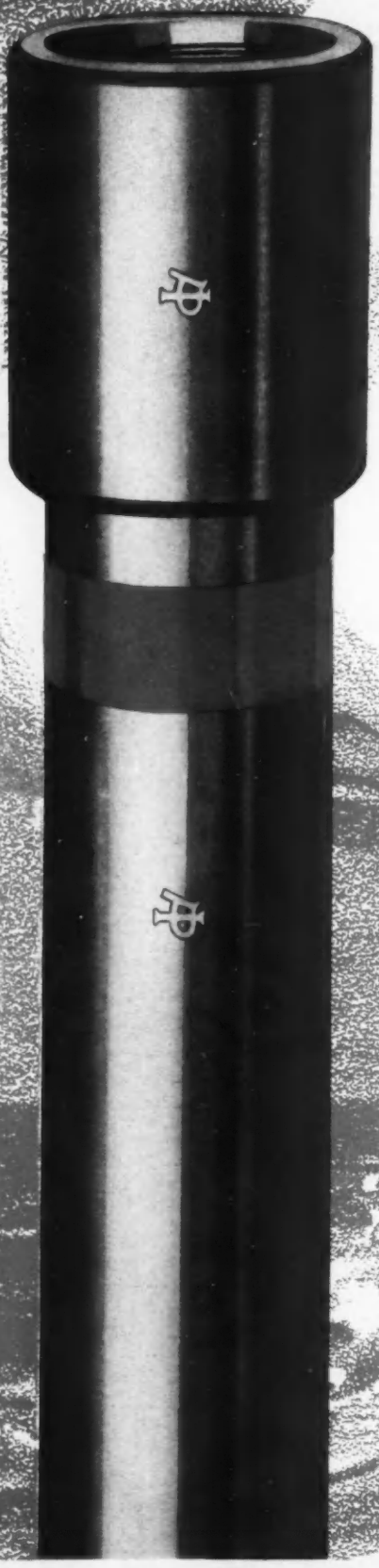

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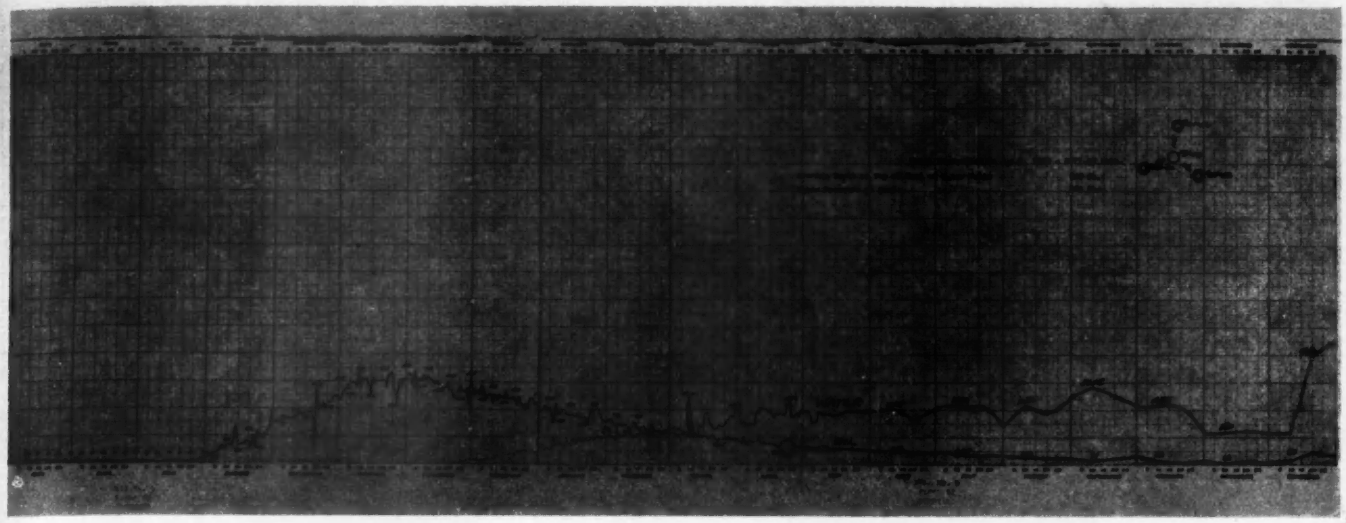


FIGURE 12

Production curve of a flood well, showing increase in water as oil production declines

approximately in the shape of an inverted cone, with the broad base of the cone lying at the top of the producing sand. If a flood well is producing at the rate of fluid entry, this so-called zone is fairly well saturated with fluid and the gradient does not reach out in radial direction from the well. Where a well is producing at a rate faster than the entry of fluid through the sand, into the bottom of the well, this gradient "crawls" back into the sand away from the well, finally reaching a distance which is controlled by the pressure of the fluid within the sand and the sand's permeability.

Most producing wells in floods of the Bradford field "pump off" within a few hours time, indicating that the rate of fluid withdrawal is faster than fluid entry. As a consequence, there is a pressure depleted area within the confines of this pressure or kinetic gradient, which is temporarily and partially denuded of freely available oil. When in the course of continued production, the encroaching flood bank reaches this low pressure or "denuded" zone, in travelling from the intake well toward the oil well, an opportunity for the by-passing of water is afforded. As a result of the difference in viscosities between water and oil, the water reaches the oil well quicker and to the exclusion of certain amounts of oil. Unless properly controlled, this situation may lead to poor recoveries from the area flooded.

A sudden appearance of water in the producing life of the average flood oil well, may usually indicate that the encroaching water bank has intercepted the kinetic gradient. This usually happens after the peak of production, or when the water bank has reached a point in the diamond within the ellipse somewhere between its widest part (the peak of production) and the tip end at the oil well. It should be understood that some wells always produce certain amounts of water from the very first, due to the existence of connate water within the sand, or because of by-passing in the sand; but the interception of the water bank with the kinetic gradient should always give a considerable increase in the amount of water being produced. It would seem from this, that the ideal production method would be to decrease the radius of this kinetic, or pressure gradient, by a slower rate of production. The ideal condition would be to pump the well at such a rate that, in 24 hours it would produce an amount of fluid exactly equal to the amount which gained entry to the bottom of the well. In other words, reduce the rate of pumping so that the well would never "pump-off."

Figure 14 shows the production curve of a well where no water was produced until after the peak production was reached. This is an example of water bank interception of the kinetic gradient. There was no increase in pressure application at the intake well and all other conditions were constant.

The interception of the kinetic gradient zone by the advancing water bank would most quickly take place in wells which are produced by flowing their production. This happens because they flow by heads, and immediately after the production of a "head" the kinetic gradient reaches out the greatest distance. Consequently, the interception would take place more quickly than would normally be the case.

Delayed Drilling and Production

The method of delayed drilling or production is gaining favor in the Bradford field and has many points of advantage to recommend it. This method, as the name describes, is simply a postponement of producing the oil well in a flood until the assembled and encroaching water bank has collected under stress all of the recoverable oil in the five-spot. In some cases the oil wells have not been drilled until the intake water wells are "loaded" and have received water for several months. In other cases, the oil wells have been drilled but have not been produced until later. In the latter case, it is almost necessary to use a packer on the tubing of the oil well to prevent the migration of oil into porous "thief" sands, thus eliminating an irrecoverable loss. Where the oil wells are not drilled in until the five-spot is "loaded," there is a chance for loss of oil

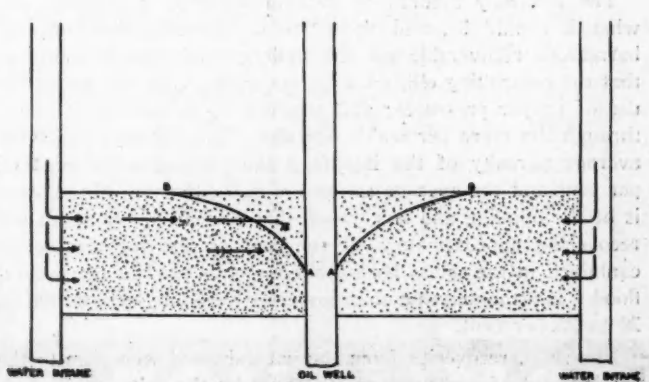


FIGURE 13

Diagram showing imaginary kinetic pressure gradient as it might exist in flood well.

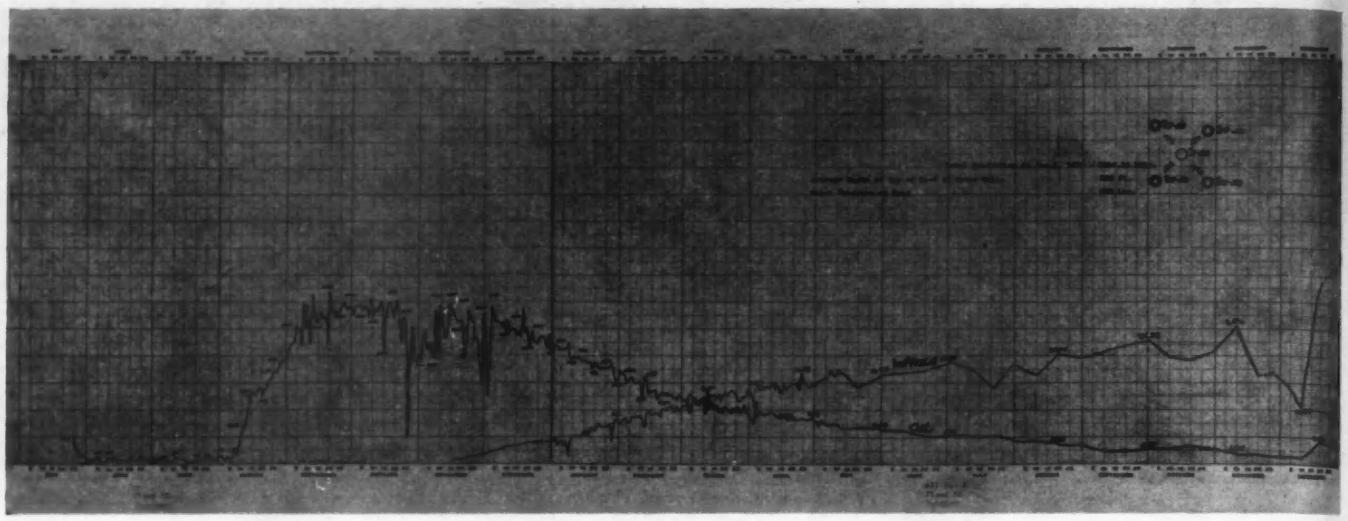


FIGURE 14

Production curve of a flood well, showing appearance of water shortly after peak of production of oil was reached.

flowing on the ground, unless precautions are taken to prevent it.

In the delayed program, where the oil wells are not produced, there is no continued path of least resistance afforded the migrating fluid, and the zone under stress is not elliptical in shape, but circular. It will be remembered that the ellipse is set up only when wells are operated in pairs, and there is a chance for fluid escape. After the bank is assembled under the delayed plan, and the oil well is started on production, the zone of fluid movement then leaves the circular shape and is converted into an ellipse, which will have the properties previously assigned to it by the pressures used. It is thought that the delayed program will give better recoveries, as the chances for differential movement or water by-passing through beds of different permeability are reduced. Usually the most permeable streak of sand controls the entire flood. The amount of water needed for flooding is reduced, therefore, by any method which will eliminate by-passing.

The same precaution for the reduction in radius of the kinetic gradient should be taken in the delayed flood, as under the continuous production program. This is accomplished, as before, by producing at a slow rate when the well is open for production. The alternate opening and closing of the producing well has the tendency to repeatedly convert the circular flooded zone into ellipses and then back into circles.

Efficiency of Flooding

The efficiency secured to date in flooding is probably not what it should be, and there are undoubtedly thousands of barrels of recoverable oil left underground, due to the fact that the controlling ellipses were not made large enough by the use of proper pressures; and also due to by-passing of water through the more permeable horizons. Torrey[3] states that the average porosity of the Bradford sand is approximately 11.5 per cent and the average saturation 60.0 per cent. Mr. Torrey is of the opinion, and has found, that efficient water floods are recovering approximately 40 per cent of the recoverable oil contained in the sand. By former methods used in the natural flood it is estimated that the recoveries were only approximately 20 to 25 per cent.

The small recoveries from the natural flood were due to the employment of pressures created only by the column of water standing in the intake wells. These hydrostatic pressures were never large, and in most cases were incapable of creating an ellipse wide enough to give complete coverage of the area under flood. Such practice necessitated close spacing. The same theory of the ellipse controls the natural flood, as well as the high pressure flood.

Sand cores frequently show saturation equivalent to 30,000 barrels per acre; saturations seem to vary between approximately 10,000 barrels to 40,000 barrels per acre. Actual recoveries have varied between 2000 and 8000 barrels per acre. On leases where it is now known that lower pressures were used than were desirable, there are splendid opportunities for experimental work in widening the ellipse, and increasing the zone of recovery. Once the size of an ellipse is determined, it is difficult to increase it, particularly after a definite ingress of fluid to the oil well has occurred, or after the interception of the water bank with the kinetic or pressure gradient has taken place. For this reason, the necessary pressure which will give the proper size ellipse should be used from the beginning, and then reduced later on if desired.

To determine the approximate size of ellipse which exists in any flood, divide the pressure which has been used on the face of the sand by the frictional resistance of the sand between the intake and oil wells plus any back pressure which exists on the sand in the oil well; extract the square root of the quotient and the resulting answer will be the ellipse factor. For instance, on a certain lease the writer is familiar with, a pressure of 1230 pounds per square inch had been in existence on the face of the sand in the intake water wells. The frictional resistance between the intakes and oil wells was 874 pounds per square inch, and there was no back pressure on the oil well:

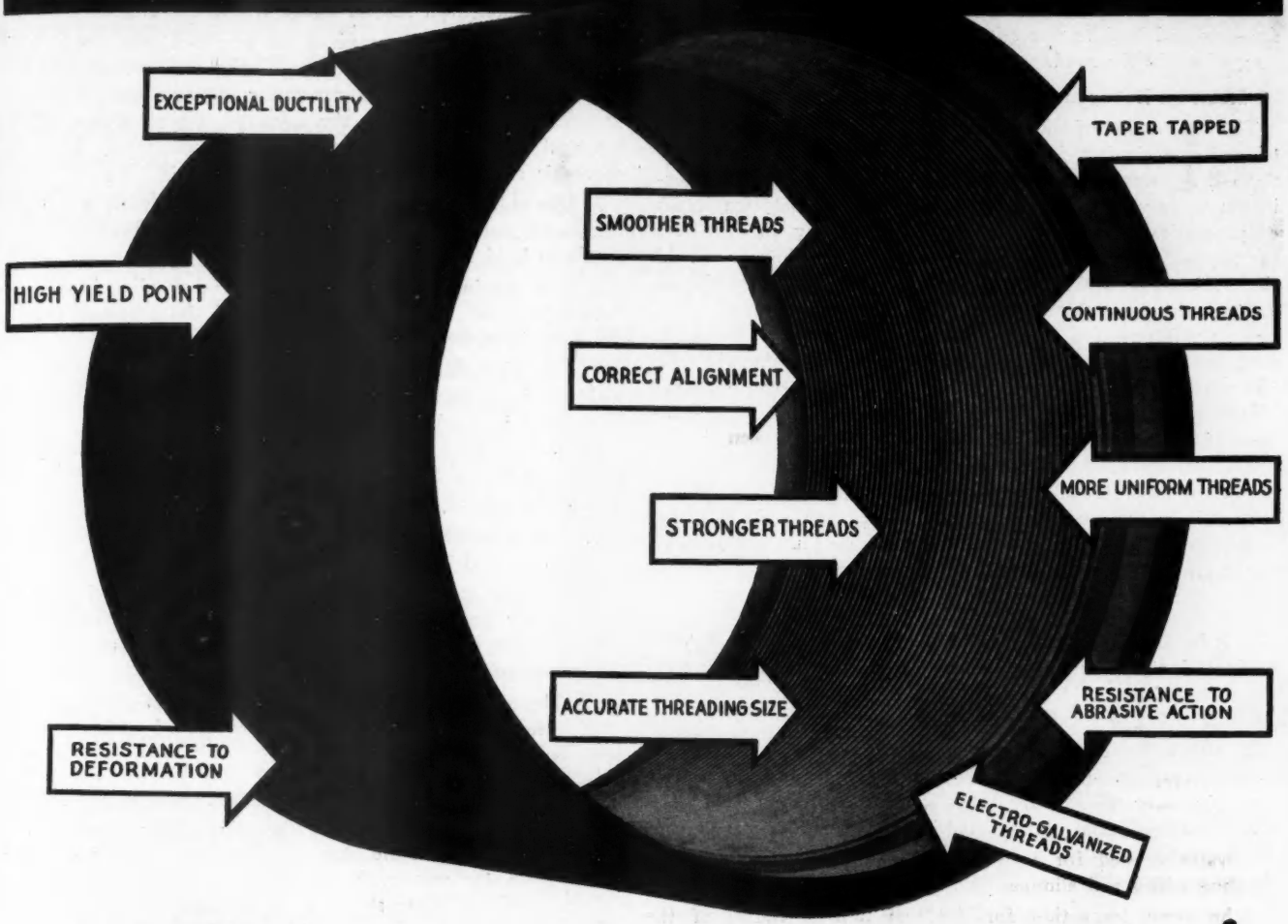
$$\frac{1230}{874} = 1.406 \qquad \sqrt{1.406} = 1.185$$

This value of 1.185 is the ellipse or coverage factor, and by reference to Figure 4 it may be seen that this gives a coverage of only 65 per cent. This method of arriving at the value of the ellipse factor is that outlined by Herold, and is based on the law of radial flow where the pressure varies as the square of the radius, or the radius varies as the square root of the pressure.

An important factor in flooding is the drilling of straight holes. Although the wells drilled in the Bradford and Allegany fields are comparatively shallow, the deepest probably not being over 2500 feet, there is a chance that in some cases the wells have enough deviation from the vertical to destroy the

[3] Torrey, Paul D., "The Water Flooding of Oil Sands"—Petroleum Engineering Handbook, Second Edition, Palmer Publications, Inc., Los Angeles.

COUPLING *facts*



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perfect spacing program which is laid out on the surface of the ground. It only takes a five-degree deviation from the vertical in a 2000-foot hole to put the bottom of the hole 174 feet away in a horizontal position from where it started at the surface. In a great many cases this is the distance between oil wells and water wells. In other words, it is possible to have the bottom of a water intake well just a few feet from an oil well. This, of course, would give a decidedly inefficient flooding and lead to excessive by-passing of water and trapping of oil in the sand.

Relation Between Ellipse Theory and Property Lines

The old method of considering the zone of flooding to consist of circles radiating from the water-intake wells, instead of the ellipse, was responsible for some fear that where water-intake wells were placed on the property line beteewn leases or properties, there would be danger of driving oil over into the adjoining lease. Such a condition is almost impossible. If there are no oil wells on one side of the line there can be no driving of fluid in that direction across the line from the other property. There is a slight advantage to the owner, however, who drills his wells and gets his flood started first when he has water wells on the property line. This advantage is represented by the tip-end of the ellipses as they cross the boundary line. If the oil wells on both sides of the line are put to producing at the same time there is no differential "robbing" in production, and each lease-owner shares equally.

Uusally lease owners enter into an agreement and share the expense of drilling the water wells on a lease line, as the input water entering these wells is of mutual benefit.

Summary

1. It is now definitely known that the fundamental principles and relationships originally outlined by Herold, as applying to the forced drive, hold true, and there is a considerable amount of field evidence to substantiate this.

2. Although there is certain to be some deviation from the ideal performance in flooding, nevertheless the fundamental relationships are not destroyed.

3. Flood wells that are operated in pairs have elliptical shaped flood zones. Wells operated singly, such as in the delayed production program, have circular shaped zones.

4. Providing the proper pressure for complete practical coverage of a five-spot has been used, the zone of stress is an approximate square or diamond lying within the ellipse which extends between the water-intake well and the producing oil well. These square or diamond shaped zones influence the type of production curve of any particular flood.

5. If less pressure than necessary for complete coverage is used, the zone of flood is a slender shaped diamond or a six-sided rhombohedron shaped figure within the ellipse.

6. Complete areal coverage of the five-spot area can be had by using a pressure on the face of the sand which is twice the value of the frictional resistance between wells. Usually, however, a pressure twice the value of this resistance is impractical and instead a factor of 1.6 is satisfactory from an economic standpoint.

7. The radial flow formula as given in this report, which has been used extensively by engineers of Gulf Oil Corporation, seems to hold true in flooding operations.

8. Well spacing in any form of artificial flooding is entirely dependent upon the sand resistance and the pressures which are used in overcoming this resistance.

9. Artificial flooding operations cause a conversion to hydraulic control and the fundamental relationships as described by Herold hold true.

10. It is believed that any reduction given to the kinetic pressure gradient will assist in reducing the amount of water which is produced by flood wells.

11. The delayed drilling and production program is believed to be sound and is recommended.

12. In most cases it is believed that flooding efficiency has been rather poor and that large amounts of recoverable oil remain in the ground due to the fact that insufficient pressures have been used in flooding.

13. The ellipse theory, in its application to flooding, will clarify the situation with respect to recovery of oil from across lease boundary lines.

Acknowledgements

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Burned hands from handling a steam hose is by no means necessary. This picture shows how employes of Phillips Petroleum Company in the Oklahoma City field have applied a wooden handle to the business end of a steam hose so that it may be directed without discomfort for the handler.

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Open Flow Tests for Potentials Start October 3 in Move to Reduce State Output to 440,000 Barrels Daily.

BRAD MILLS, *Staff Representative, Los Angeles, California*

California Has Several Tideland Possibilities

Los Angeles.—Although sentiment is strongly against tideland development in some sections of California, general conditions have led some districts to believe that their welfare would be advanced through drilling of ocean strips. Most of the aesthetic societies are loudly protesting the pollution of the beaches, but the more cold-blooded oil men favor drilling wherever there is a chance to obtain oil. A few years ago the movement to stop drilling outside the high tide line gained momentum, but a reaction is possible.

Starting with Huntington Beach toward the south, other sections which either have already produced oil from ocean wells or stand a chance to produce are Playa del Rey, Rincon, Carpenteria, Summerland, Goleta, Coal Oil Point, Elwood, El Capitan, and other less promising districts along the coast. The coast line seems to bear a significant relationship to various oil fields, but the faulting and folding occurred long before the present coast line was established.

Huntington Beach would undoubtedly produce a large quantity of oil outside the high tide line. Various interests and equipment manufacturers would profit from such a development.

Playa del Rey (Cenice) probably will be one of the last tideland fields to be developed, and there is a possibility that no drilling will ever be done beyond the high tide line. Experiences in the main part of the field were costly.

Rincon field lies mostly under the ocean, and tideland drilling will be an important item there. Development is very expensive, due to the depth of the water, but various schemes will be devised to defeat high costs.

The Carpenteria structure has never produced oil in commercial quantities, but a few operators are not satisfied with previous tests. The structure skirts the ocean, and tideland permits will be drilled to determine the possible trend. One well is now being drilled on an ocean lease.

Summerland field was one of the first to produce oil from ocean wells. The producers have all been shallow, and recent drilling along the ocean failed to indicate a larger production from deeper sands.

The Goleta ocean strip is a recognized gas field, but the necessity for drilling out in the ocean is not yet obvious. Several state tideland permits were issued, and wells were drilled to validate claims. Urgent need of gas would lead to drilling of ocean wells in this field.

The Coal Oil Point structure holds more than usual promise, and is now being drilled. The amount of work to be done on ocean leases will be largely governed by the success of the present operations.

Elwood field lies along the Pacific coast, with nearly one-half outside the high tide line. This field has been drilled extensively, but many more wells are being considered. A better demand for light oil will revive drilling on piers which may be extended at small expense.

El Capitan field skirts the ocean, but it probably will not become an economic factor at the very best. Some drilling has been done on short piers, but the major operators do not regard the district seriously.

The amount of drilling to be done in the ocean will be measured by sentiment, the demand for light oil, and restrictions imposed by the state and national governments. It is much easier to develop mainland leases than the tideland permits, and only necessity has prompted most of the drilling in the past. The oil supply has been so great that no need for additional acreage has been felt. Operators holding tideland leases feel the right to develop their holdings, even in the face of public sentiment. The risk and cost of drilling in the ocean is so great that those inclined should be allowed to spend their money in such ventures, the proponents of such development have pointed out.

Los Angeles.—California's allowable for the remainder of the year has been tentatively placed at 440,000 barrels daily, or less, and there is a possibility that this total may be placed as low as 431,000 barrels. The 448,200-barrel allowable set last week has been found too high to equal actual demands, and the lower figure substituted.

Open flow tests will be conducted in the Playa del Rey, Santa Fe Springs, Long Beach and Huntington Beach fields in rapid succession to give these districts a chance to establish a true potential. These tests will be for a duration of 10 of 15 days. The open flow test will be started at Playa del Rey on October 3. Tests at Long Beach, Huntington Beach and Santa Fe Springs will follow immediately.

Opposition to these open flow tests was largely based on the claim that the surplus oil would only add to present excesses. It has been agreed that all excesses above what the fields would make under their true allowables must be deducted from production within 30 days after the tests. This means that all overage during the 10 or 15 day tests must be absorbed by the operators immediately. Purchasing companies have agreed to take all oil during the open flow tests, but the cut-back must be immediate and complete to offset the natural excess of the test period.

One advantage of the open flow tests is that a large number of field men will be required to conduct the work. Equipment manufacturers will also profit from the short but complete resumption of operations in the various fields.

Huntington Beach Voters Favor Tideland Drilling

Huntington Beach, Calif.—The proposal to drill the tidelands adjourning the Huntington Beach field has developed some opposition in city circles, but an unofficial canvas showed that the majority of voters favor drilling ocean leases as a probable means of increasing revenue and lowering taxes.

Pacific Exploration Company has offered a $100,000 bonus and a sixth royalty for permission to develop the tideland strip, the bonus and royalty to be split with the state. At least 15 wells would be drilled as offsets to Standard Oil Company's long line of producers. The undertaking would involve a large expenditure, the network of ocean piers to run in parallel.

Carr Oil Company has offered to lease a narrow strip along the south side of Ocean boulevard and to pay a bonus of $100,000 to the city for the right to develop the lease, plus a royalty of one-sixth. This strip was originally set aside for a part of street by a subsidiary of Standard Oil Company of California. The original grant to the city did not place any restrictions on drilling operations but the Standard Oil Company will fight the leasing action.

Kettleman Hills Has Three Interesting Tests

Coalinga, Calif. — A small completion, abandonment of an edge well, and rapid progress in an extreme edge test on the northwest flank featured North Dome developments during the week at Kettleman Hills. No basic changes in structural conditions were recorded, unless the abandonment on the extreme southeast flank tends to give this part of the field a limited producing area.

Kettleman North Dome Association abandoned No. 76-34Q at 9206 feet after failure to encounter any definite showings. This well was located on Section 34-22-18, and its failure was not wholly unexpected. The southeast end of the structure shows a narrowing, and has not been regarded on a par with the northwest end. General Petroleum Corporation developed production along the axis opposite this abandoned test, proving that the inside leases are productive.

North Kettleman Oil & Gas Company is drilling rapidly ahead below 8950 feet in Lillis-Welch 1, extreme flank test toward the northwest. The sand cored does not appear to contain water, but the absence of an oil cut is significant. This well is more than two miles from Superior Oil Company's Huffman 1, which was itself considered an edge producer for a time.

Kettleman North Dome Association completed No. 81-4P with an initial production of 1800 barrels from 8309 feet. This flow was somewhat smaller than the average for wells located similarly on structure, but the slightly higher gas-oil ratio pointed to the inclusion of a higher percentage of the gas zone than was tested in some of the earlier completions.

Kettleman North Dome Association is drilling below 9050 feet in No. 36-30J, extreme edge test on the northwest flank which may be outside the producing limits. This well is considerably beyond the accepted line which defines the acknowledged limits of the field, but is slightly inside the problematical line which supposedly gives a lease a chance to stand on its own merits. It is apparently sharply out of line with the axis of the North Dome.

The status of the Middle Dome did not change during the week, with Standard Oil Company fishing for the drill pipe at 6354 feet and other wells idle. The difficulty encountered in two of the three wells drilled in this part of the field should not be held as evidence that the Middle Dome will not produce a good quantity of light oil. Standard Oil Company drilled to 8406 feet in No. 6-29V, but has been unable to reach bottom because of the drill pipe failure. Universal Consolidated Oil Company drilled to 5935 feet in Bunting 1, but suspended operations on the strength of trouble in other wells and questionable faulting in its own test. Petroleum Securities Company has made no further effort to recover the iron from Burbank 1, semi-discovery well which was drilled to 9332 feet and tested with some success above the plug at 9212 feet.

Due to shutting off of most of the upper gas formation on the North Dome, the gas supply and average pressure in many wells have been reduced. This reduction is a natural development, as the gas waste was so enormous during the early development of the field that the state attempted to enforce the gas conservation act. Gas production in some of the best producers is above 1000 cubic feet per barrel of oil. This has lowered the gas supply sharply, and has reduced the pressures at which the wells might ordinarily flow from the top of the formation.

Kettleman North Dome Association is injecting gas into No. 61-2P from No. 41-2P, but the operation is being carried out merely to bring the pressure of the injection well to above that required by the high pressure line. The higher pressure well is being usd to help the lower pressure producer. No. 41-2P is an unusually good gasser and can spare some of its flow to the weaker producer.

California Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
FRUITVALE—		
Sea Hawk Pet. Co., No. 2-B, 23-29-27	240	3785
KETTLEMAN HILLS—		
Kettleman North Dome Association, No. 81-4P	2100	8309
LONG BEACH—		
P. G. Cummins, Baehr 3	175	6260
PLAYA DEL REY—		
Barnsdall Oil Co., Burks 12	100	5903
SANTA BARBARA COUNTY—		
Western Gulf Oil Co., Bradley 1	* 10,294	

New Operations

KETTLEMAN NORTH DOME—Kettleman north Dome Assn., No. 87, 30-21-17.

LOS ANGELES COUNTY—Palm Ridge Oil Co., No. 1, 2-2-15.

RINCON—Honolulu Oil Corp., Valenzuela 1, 23-3-24.

SANTA BARBARA COUNTY—Casitas Oil Co., No. 20202, 34-4-25.

VENTURA COUNTY—G. L. Strobeck, Strobeck 1, 34-4-23. Livermore and Kennedy, No. 21, 33-4-25.

Wildcat Drilling Report

(Wells Shutdown not included)

NORTHERN CALIFORNIA

KERN COUNTY

BUTTON WILLOW—General Pet.'s Morris 2, 6-28-23, cmt surface cas 500 ft, will deepen. Milham Exploration Co.'s Page 1, 6-28-23, liner parted, sd 3221 ft; S. P. 41-17, 17-28-23, will plug back from 2648 ft and make production test; Whitaker 2, 8-28-23, new lcn.

DEVIL'S DEN—A. S. Halloway's Lincoln 1, 11-25-18, fsh for cas 675 ft. Tom Hannah's No. 1, 25-25-18, ur 3465 ft.

McKITTRICK—Ozena Oil Co.'s No. 2, 27-29-21, dr gray shale 2850 ft. Welport Oil Co.'s No. 2, 19-29-21, sr 615 ft.

WEED PATCH—Hay Pet. Corp.'s No. 1, 22-30-29, lcn.

SANTA BARBARA COUNTY

CARPENTERIA—Casitas Oil Co.'s State 202-2, sp.

COAL OIL POINT—Bolsa Chica Oil Corp.'s No. 191-1A, redrilled to 4026 ft in Vaqueros sand, making production test, flowing oil and water, will run liner.

CUYAMA—Cuyama Valley Oil Corp.'s No. 1, 12-10-27, coring 728 ft.

LOMPOC—Field Gasoline Corp.'s McLean 1, 6-7-33, dr shale 2165 ft.

ORELLA—Oakburn Oil Co.'s State 169-1, pumping oil and water, td 2821 ft.

SANTA MARIA—Superior Oil Co.'s Core Hole D-1, 1-9-33, coring 700 ft.

SANTA ROSA ISLAND—Standard's No. 1, Coring hard gray sand 3515 ft, only minor oil and gas showings been found.

VENTURA COUNTY

CONEJO—American Oil Co.'s Powell 1, 33-2-20, running 10-in cas 2060 ft.

FILLMORE—Sovereign Oil Co.'s Leavins 1, 23-4-19, grading roads to lcn.

HOPPER CANYON—Bardeen Pet. Co.'s Lankershim 2B, 13-4-19, re-dr 2000 ft.

SAN MIGUELITO—Honolulu Consolidated Oil Co.'s Valenzuela 1, new lcn.

SANTA PAULA—J. W. Mosher's No. 1, 22-4-21, fsh 580 ft, will deepen.

SESPE—H. A. Ivers' Star 7, 1-4-20, co 625 ft. Merchant's Pet. Co.'s Cochran 6, 1-4-20, dr shale 150 ft.

SIMI—C. and H. Anderson's Marr 11, 36-3-18, pumping some oil, td 1876 ft.

SULPHUR MOUNTAIN — Wilshire Annex Oil Co.'s Thompson 1, 20-4-21, rigging cable tool outfit 300 ft.

TIMBER CANYON—Petro Well Producing Co.'s No. 1, 18-4-20, dr shale 1200 ft. Superior's West 3, 13-4-21, dr onl sand 4255 ft.

MISCELLANEOUS

KING COUNTY—Kettleman Reef Ridge Oil Co.'s Seymour 2, 10-23-16, rig. Knudsen and Schmidt's Avenal 1, 36-23-17, dr gray sand 5765 ft. Dudley Dome Oil Co.'s No. 1, 9-23-20, dr out cmt 340 ft. Triune Gas and Oil Co.'s No. 1, 5-23-20, bailing on test, shows some gas, td 1100 ft. Glen Woodward's No. 1, 32-22-20, deepening from 775 ft.

MERCED COUNTY — Harry Bergman's Loma Farms 1, 12-12-11, lcn. Los Banos Pet. Co.'s No. 1, 26-10-9, rig.

SAN LUIS OBISPO COUNTY—Shell's San Miguel-Mahoney 1, 4-25-12, dr shale 1950 ft.

TULARE COUNTY—Sheldon and Gholson's No. 1, 34-22-27, testing 915 ft, may deepen.

SOUTHERN CALIFORNIA

FULLERTON—Orange Thorpe Corp.'s Skinner 1, 32-3-10, sd 4552 ft.

HASLEY CANYON—J. H. Smith's Gilmore 1, 32-5-17, bailing water 3212 ft.

LYNWOOD—William L. Jones' Graham 1, 31-2-12, dr shale 2265 ft.

EL MONTE—Hutchinson and Andrews' El Monte 1, 11-1-11, rigging rotary.

NEWHALL—Sandbar Pet. Corp.'s Walker 1, 35-5-16, dr shale 525 ft. Security Trust Development Co.'s Newhall 1, 31-5-14, dr shale 150 ft. Superba Pet. Corp.'s Newhall 1, 11-3-16, co 175 ft, will deepen.

PALMS—Palm Ridge Oil Co.'s Palms 1, 2-2-15, dr shale 525 ft.

PLAYA DEL REY—Cooperative Development Co.'s Mesmer 1, 26-2-15, dr shale 5000 ft.

SAN JUAN CAPISTRANO—Mineral Exploration Co.'s Echinique 1, 8-8-7, dr hard sand 3242 ft.

OKLAHOMA FIELDS

Wentz Noble County Wildcat Is Important Wheather or Not It Fulfills Promise of Substantial Production.

FLOYD SWINDELL, *Staff Representative, Tulsa, Oklahoma*

Two Seminole Areas Rival Oklahoma City Activity

Seminole, Okla.—Two localities in the Seminole district lead that area in activities and closely press the Oklahoma City pool for state leadership. The Wewoka-Holdenville area which adjoins the Fish pool on the east and northeast is the most active Seminole pool and one, which if given a sufficient outlet, would assume state leadership within a short time. Development is in three sands. The first, as yet unnamed, is found slightly below 1000 feet. Lower production is found in the Calvin and Wapanucka formations. Burke-Greis Oil Company's Chapman 1, CSW SW NW Section 10-7n-8e, most recent completion in the pool, swabbed 600 barrels of oil and 80 barrels of water the first 24 hours from sand at 2892 to 2926 feet. A small showing of oil and water was found in the upper sand. Galbreath et al set 90 feet of 4⅞-inch liner on top of the sand at 1175 feet in Narcome 1-A, CSW SW NW Section 14-7n-8e, after encountering a show which filled the hole 1100 feet in 48 hours. Total depth is 1194 feet. Mid-Continent Petroleum Corporation's Tiger 2, CSW SE NE Section 9-7n-8e, made 375 barrels of oil the first 12 hours and was estimated good for from 15 to 20 million cubic feet of gas from Booch sand at 2888 to 2932 feet.

Bebee Area

The Bebee pool in northern Pontotoc County is the second of the smaller areas to come into prominence during the past few weeks although it has been the scene of some activity for several months. Superior Oil Company's Boyd 4, CSE NE NW Section 32-5n-5e, in the southern portion of the pool, was cleaning out with 700 feet of oil standing in the hole after shooting with 20 quarts at 2523 to 2544 feet. Top of the Viola limestone was encountered at 2412 feet with pay at 2465 to 2544 feet. Ligon and Todd et al completed Starritt 1, SE SE SE Section 29-5n-5e, for an estimated 30 barrels daily from sand at 1750 to 1765 feet. Patsey Oil Company was fishing for tools after topping Viola limestone at 2382 feet and having a show of oil at 2441 feet in Burke 1, CSE NE SE Section 25-5n-4e, on the west edge of the pool.

West Seminole Pool

Amerada Petroleum Corporation and Stanolind Oil & Gas Company shot the Wilcox sand with 20 and 40 quarts and swabbed 663 barrels of oil in 13½ hours from Chase 6, CSW NE SW Section 29-9n-6e, on the discovery lease in the West Seminole pool. Wilcox sand was logged at 4089 to 4117 feet. The Texas Company was preparing to run eight-inch casing in Sandlin 3, CSE NW SW Section 29-9n-6e, after reporting Mayes lime at 3715 feet, Woodford shale at 3810 feet, Sylvan shale at 3915 feet, and top of the Viola limestone at 4042 feet. Total depth is 4053 feet. At 3000 feet the hole was found to be only one degree off vertical but at 3900 feet it had departed at an angle of 11 degrees which caused the operators to debate as to whether it should be plugged back and straightened or carried on with the hope that the turn is not abrupt.

Sacred Heart Area

Mid-Continent Petroleum Corporation's Schrader 1, CNW NW NE Section 6-6n-5e, directly east of the Sacred Heart pool, made 157 barrels of oil and 12 barrels of water the first 24 hours from sand at 2831 to 2852 feet. Most of the wells in the Sacred Heart area have made water initially or soon after completion.

Phillips Petroleum Company's Fixico 5, SE SW NW Section 20-9n-6e, cored from 2715 to 2725 feet, the first four feet being saturated and the bottom apparently dry. It was then cored from 2715 to 2730 feet but failed to recover.

Potentials More Interest Than New City Completions

Oklahoma City.—Potential tests on recently completed wells outranked in interest the showing of several routine completions in the Oklahoma City pool during the past week. Leading the list was Phillips Petroleum Company's Ingle 1, SE SW NE Section 3-11n-3w, which produced 12,607.53 barrels in four hours, flowing through two four-inch chokes. At this rate the 24-hour calculated potential would be 75,645.18 barrels. Gas increased from 44,000,000 cubic feet, during the first hour, to 114,000,000 cubic feet the last hour.

J. C. Shaffer et al's McKee 2, NW NE NW Section 3-11n-3w, made 7697 barrels of fluid in four hours and six minutes and was estimated to be making about 65 per cent sand, mud, and drilling water. Wells in this sector of the field make considerable amounts of sand during the first few flow periods and usually are making their greatest rate of flow when the sand has disappeared. The well was estimated to be making about 25,000,000 cubic feet of gas.

Other wells which have been given outstanding potentials on recent tests taken under supervision of the national guard are: Phillips Petroleum Company's Gentry 1, NW SW NE Section 3-11n-3w, 26,440.68 barrels, adjusted; the same company's Bump 1, SE SW NE Section 3-11n-3w, 22,375.02 barrels, adjusted; and Slick-Urschel Incorporated's Classen-Edwards 13, CNL SE NE SW Section 3-11n-3w, 21,271 barrels, adjusted.

Noble County Wildcat Will Make 2000 Barrels Daily

Perry, Okla.—Oklahoma's premier wildcat test is definitely beyond the guessing stage and can be rated good for at least 2000 barrels of oil which tests better than 41 degrees corrected. The test, Wentz et al's Wolff 1, CSE NW Section 17-20n-2w, located approximately nine miles southwest of the town of Perry, has had the oil fraternity on the jump since September 21, when it encountered the upper Wilcox sand and had 1800 feet of oil standing in the hole after a few hours. Reports as to top of the sand are conflicting but it seems generally believed that first grains of Wilcox showed in the cuttings at about 5126 feet. Drilling deeper by stages operators encountered green shale at about 5184 feet and top of the second sand at 5196 feet. Here again the reports conflict as one company shows top of the second sand at 5193 feet. Total depth is 5197 feet, apparently one foot in what is believed to be the lower Wilcox. During a four-hour test late in the week it was making 67 barrels an hour and gas had increased to between five and 10 million cubic feet. It is now shut down awaiting pipe line connections before drilling deeper. According to the best estimates that can be made the lower Wilcox sand should have a minimum thickness of 30 feet and may have as much as 50 feet. It is understood that Empire Pipe Line Company will lay a line to the well.

Regardless of its outcome the test can be recorded as one of the most important since discovery of the Oklahoma City pool in 1928.

Konawa Work Over Going Deeper From 65 Barrels

Seminole, Okla.—Stewart et al's Bailey 1, CNW NE NE Section 28-7n-4e, midway between the St. Louis and Pearson Switch pools, has 2000 feet of oil in the hole from Hunton limestone topped at 3621 feet and penetrated to 3642 feet. C. W. James et al were drilling by four joints of liner at 4060 feet in Garrett 1, SE SE NW Section 28-7n-4e, three locations south and three west of Bailey 1. Ten joints of liner were lost in the hole and operators were successful in fishing out six joints.

Woods et al's Charty 1, CNE SW SW Section 29-6n-6e, in the southern portion of the Konawa pool is cleaning out to drill deeper after swabbing 65 barrels of oil in 24 hours. The well was originally completed March 24, 1931, as a 60,000,000 gasser from sand at 2543 to 2607 feet. In July of this year it was deepened to sands at 2676 to 2695 feet and 2705 to 2729 feet, where it made approximately 10 barrels of oil and 20,000,000 cubic feet of gas. On the recent swabbing test oil had increased while gas had decreased to about 4,000,000 cubic feet. The well is peculiarly located on structure to have made such a large gas well and deeper drilling may reveal that it really is located well on the lower structure which does not coincide with that on the upper formations or it may be found that the present known structure can be extended farther southward. When completed it was known as an edge well.

Comanche County Wildcat Preparing to Drill Plug

Lawton, Okla.—A. E. Trowbridge et al were preparing to drill the plug in Price 1, SE NE NE Section 30-2n-9w, interesting wildcat test located about 14 miles east of Lawton in southeastern Comanche County. Nearest production is over 2½ miles northwest. Casing was set early in the week at 1980 feet on top of a series of sands which were penetrated to 2043 feet. It is reported that approximately 20 feet of saturated sand was recovered during coring operations and the test is being accorded better than even chances of making a producer.

Logan County Wildcat Test Promises New Interest

Guthrie, Okla.—Ramsey Petroleum Corporation and Eason Oil Company were drilling below 3025 feet in Duck Club 1, NW NW NE Section 10-16n-4e, semi-wildcat test located approximately one mile south of the Eason discovery well on the Cotcha farm in western Logan County. Operators have spent more than a week drilling up a rotary slip which fell in the hole at 2777 feet. This test is one of the next which Oklahoma oil men will place under close observation. Although not rated as a rank wildcat by the usual standards it is in fact fairly wild since it is in an area of unknown quantities and near a well which is producing from Misener sand. It is playing the Blackwell Anticline-Granite Ridge trend which has yielded a number of the prolific pools of north central Oklahoma.

Oklahoma Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
ATOKA COUNTY—		
Winham et al, Redwin 1, se sw sw 23-1n-14e	*	135
Barton et al, Miller 1, ne sw sw 26-1n-14e	*	525
Hicks et al, Morris 1, ne nw se 5-1n-15e	*	500
CREEK COUNTY—		
Smith & Williams, Tiger 1-A, ne se se 28-16-9e	25	2599
Dixie Drlg. Co., Walker 4, swc ne sw 21-18-9e (owdd)	190	3215
T. E. Mann, Coonrod 2, se c 18-19-9e	25	2232
Regal Oil & Gas Co., Bigpond 32, sw nw sw 6-18-12e	5	1675
HUGHES COUNTY—		
Limestone O&G, Walker 2, csl ne ne 15-7-8e	125	1207
LINCOLN COUNTY—		
Gypsy Oil, Sawyer 1, se c nw 1-15-6e (owdd)	240	3698
Stanolind O&G, Lewis-Brower 1, ne c sw 1-15-6e (owdd) ....15 hrs.	543	3694
JEFFERSON COUNTY—		
Shasta Oil, Bolinger 1, sw ne sw 26-4s-6w	*	2676
OKFUSKEE COUNTY—		
Stekell et al, Likowski 2-A, cnl ne sw 23-11-11e (owdd)	25	2084
OKLAHOMA COUNTY—		
Phillips et al, Ingle 1, se sw se ne 3-11-3w	¶39-12,763	6407
Slick-Urschel, Frisco 5, ne nw se 3-11-3w	¶98-2079	6383
Mid-Texas Pet. Co., Vaughan 1, swc ne 15-11-3w	¶21-4034	6514
Phillips, Fish 1, ne sw ne sw 15-11-3w ....3½ hrs.	1869	6526
OKMULGEE COUNTY—		
Hazlett et al, Burton 1-A, se c 25-14-12e	10	1988
J. L. Selby, Stevens 13, cwl ne sw 10-14-14e	7	1143
PITTSBURG COUNTY—		
Nelson & Flynn, Anderson 1, se c sw 12-7-12e	*	3240
PONTOTOC COUNTY—		
Brydia et al, Layne 1, swc se nw 30-5-5e	110	2545
Lake Oil Co., Malloy 1, nwc se sw 30-5-5e	120	2593
STEPHENS COUNTY—		
Pace et al, Tierson 1, cse sw nw 14-1n-9w	*	2334

New Operations

ATOKA COUNTY—Hicks et al, Norris 2, se ne nw se 5-1n-15e. E. M. George, Reddin 1, sw ne sw 19-1n-15e.

CREEK COUNTY—Wallace et al, Bartlett 1, se nw se 3-15-7e. Smith & Williams, Orcutt 2-A, nw sw ne 27-16-9e. L. B. Jackson, Bankston 1, sw nw nw 26-18-8e. Merritt et al, Williams 4, cel nw ne 27-18-8e. Jackson & Wise, Grayson 1, se c ne se 20-18-9e (owdd). Sidwell Drlg. Co., McGee 2, ne sw nw 36-19-8e. Curtis Oil et al, Baugh 3, cel nw ne 22-19-9e.

HUGHES COUNTY — Limestone O&G, Walker 4, ne c se ne 15-7-8e.

MUSKOGEE COUNTY—Robinson Oil Co., Brown 3, ne se se 18-13-16e. Mack Drlg. Co., Richards 9, sw ne ne 33-16-15e.

OKLAHOMA COUNTY—Phillips Pet. Co., Logue 1, sw ne sw 15-11-3w. Phillips, Wooley 1, se sw ne 22-11-3w.

OKMULGEE COUNTY—H. E. Clark, Williams 8, nwc ne 22-13-12e.

POTTAWATOMIE COUNTY — Mid-Continent Pet. Corp., Archer 4, se c 14-6-3e (owdd). Brackett & Kahl, Atwater 1, nwc se se 9-7-4e.

STEPHENS COUNTY—Lesh Bros., Wilkerson 1-A, se ne se 8-1s-5w. Gilbert et al, Green 4, ne se ne 2-2s-8w. J. A. Linson, nw sw nw 2-2s-8w.

Wildcat Drilling Report

(Wells shut down not included)

KAY COUNTY — Blubaugh et al, Makeswater 1, c nw ne 30-25-1e, td 2569 ft, S. I.

NOBLE COUNTY—Wentz Oil Corp., et al, Wolff 1, c se nw 17-20-2w, 1800 ft oil in hole, Wilcox sand 5130-79 ft td.

BLAINE COUNTY—Watonga Pet., Masters 1, sw nw nw 27-16-11w, td 672 ft.

CREEK COUNTY—O. O. Owens, Fee 1, nwc, 23-15-7e, rust. and sd.

OKLAHOMA COUNTY — Sinclair-Prairie Kennedy 1, c se nw 4-13-1w, D&A, td 6120 ft.

LINCOLN COUNTY — Sovereign et al, Flower 1, sw se se 14-12-3e, dr 2522 ft.

BECKHAM COUNTY—Pattee Royalty Co., Goose Tree 1, sw s sw se 32-10-23w, sd 924 ft.

WASHITA COUNTY—Miley Pet., Montgomery 1, sw nw se nw, 23-9-17w, td 1004 ft. Miley Pet., Wolfe 1, ne sw 23-9-17w, moving in tools.

SEMINOLE COUNTY—Donley et al, Shepard 1-B, se ne 4-8-8e, td 1120 ft, ur 6-inch 1120 ft.

PITTSBURG COUNTY—Moffett & Hall, Jones 1, c ne nw, 14-8-14e, td 1675 ft, lost tools, sd.

KIOWA COUNTY—Christian, James 1, ne se, 8-6-18w, td 1610 ft, fsh tools. McWhirter Bros., Kline 1, se sw, 5-6-16w, td 830 ft, sd.

LATIMER COUNTY — Paul English, Unknown 1, cnw se 16-6-19e, td 1542 ft, D&A.

PONTOTOC COUNTY — Blackwell O&G, Abbott 1, nw sw ne, 14-4-6e, sand 730-35 and 792-840 ft, td 900 ft, rng 10-inch. Sunray, Grant 1, c se ne, 11-4-8e, dr 1960 ft.

GRADY COUNTY — English Drlg. Co., Heenan-Coe 1, ne se ne, 32-3-7w, swb 3 bbls per hour, filled up overnight to 2500 ft.

PONTOTOC COUNTY—Williams, Kroth 1, ne se, 33-3-4e, dr 870 ft so. 825-40 ft.

COAL COUNTY—Fink & Russell, Miller 1-A, se ne 10-2n-8e, (owdd) dr 2600 ft. Dodd & Burton, Grigsby 1-A, nw se ne 35-1-8e, moving in tools, sd.

ATOKA COUNTY—Winham et al, Redwin 1, se sw sw 23-1-14e, td 135 ft, D&A. Barton et al, Miller 1, 26-1-14e, td 525 ft, D&A. Hicks et al, Morris 2, se ne nw se 5-1-15e, dr 185 ft. George, Reddin 1, sw ne sw 19-1-15e, dr 100 ft.

MARSHALL COUNTY—Hughes, Ayres 1, ne se, 30-7s-7e, td 906 ft, D&A.

JEFFERSON COUNTY — Bridwell Oil, Wolghamuth 1, nw ne se nw, 30-6s-5w, td 500 ft, sd for water.

BRYAN COUNTY—C. A. Hannel, White 1, nw ne nw 28-6s-8e, td 1542 ft, sd.

MARSHALL COUNTY—Thomas et al, Setliff 1, sw se se sw 36-5s-7e, sd 20 ft.

JEFFERSON COUNTY—Shasta Oil, Bollinger 1, sw ne sw 26-4s-6w, td 2676 ft, D&A.

ATOKA COUNTY—Brookshire et al, Guinn 1, nwc 18-3s-10e, dr 2850 ft.

STEPHENS COUNTY—Gillette Bros., Colley 1-A, nw se nw 17-2s-8w, r.u.r.

ATOKA COUNTY—Malarnee et al, D. O. K. Land Co., 1, c s½ se 35-2s-13e, s. o. 448-503 ft, dr 620 ft.

COAL COUNTY—Radial Oil, Richardson 1, ne nw 2-1s-8e, 5-inch 1467 ft, dr 1570 ft in Wapanucka.

KANSAS FIELDS

Winfield's Potential Makes Difficult Problem for Purchasers; Harvey County Test to Drill to Hunton Lime.

FLOYD SWINDELL, *Staff Representative, Tulsa, Oklahoma*

Winfield Townsite Placed On 30-Barrel Allowable

Wichita, Kansas.—The Winfield Townsite pool, one of the most active areas in Kansas, has been placed on a flat 30 barrels per well per day with an extra allowable of 30 per cent above the margin based on potential, effective September 20. It is understood that plans are under way to limit all wells completed after September 25 to the flat allowable of 30 barrels. A rather rapid increase in the number of completions has raised the daily potential to a point that the purchasers could not handle all of the production. The townsite pool received its first development late in 1926 when oil was found in a sand lying between 2275 and 2370 feet, initial production ranged from about 25 to 50 barrels and some of the wells made water initially. In the early part of 1928 several of the wells were deepened to a sand at 2900 to 2990 feet, where a new gas and oil bearing stratum was found. Late in the same year oil was found at 3270 to 3282 feet, probably in the Conglomerate. In November, 1931, a deepening campaign was started and oil found in the Arbuckle "Siliceous" lime at depths ranging from 3250 to 3310 feet. Some of the wells have initial production as high as 700 barrels.

Magnolia Locates Wildcat Southwest of Hollow Pool

Wichita, Kansas.—Magnolia Petroleum Company has announced location for a semi-wildcat test in NE NW NE Section 30-22s-3w, one-half mile southwest of the Hollow pool in northwestern Harvey County. It is understood that the company will try to extend the productive area of Hunton lime which does not produce in Kansas except in the Hollow pool. Elsewhere in the state where Hunton lime has been identified it has been dry and no production has been found below it. McBride Incorporated was rigging up standard tools to complete Freisen 2, NW NW SW Section 2-22s-3w, after setting eight-inch casing on top of the Hunton lime at 3489 feet. Total depth is 3490 feet, one foot in the lime. The company has announced location for Freisen 3, NW SW SW Section 2-23s-3w, two locations south of Freisen 2.

Derby Oil Company et al were plugging back to shut off water in Stoltenberg 1, CNE SE SE Section 21-16s-10w, west extension test to the Stoltenberg pool in southwestern Ellsworth County. Arbuckle "Siliceous" lime was penetrated from 3318 to 3362 feet where operators had 1000 feet of oil and some water. Water apparently is coming from the lower six inches of the formation and should be plugged off without much difficulty. After a shut off has been made the hole will be shot.

Roy Ramsey was rigging up No. 1, NW SW NW Section 32-19s-9w, just east of the town of Chase in western Rice County. The test will be located on a small tract in the middle of a block owned by Gypsy Oil Company.

T. C. Johnson was building rig for an interesting wildcat in CNE NW NE Section 27-26s-10w, 1½ miles west of Olcott in Reno County. Nearest production is approximately six miles to the southwest where Skelly Oil Company recently completed Leisman 1 as a 27,000,000 gasser in Arbuckle "Siliceous" lime. This portion of Reno County has been tested but very little and the Johnson test probably will be watched very closely since it will be playing a northeast-southwest trend through the Leisman or Miles area of northwestern Kingman County. The nearest test to the north, which has gone deeply enough to have encountered the Arbuckle, is Gypsy Oil Company's Hudson 1, CSE NE Section 27-24s-10w, 11½ miles away, was a dry hole at 4620 feet.

Kansas Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
BUTLER COUNTY—		
Empire O&R, Houston 1, se c sw 19-26-5e (owdd)	80	2691
J. Scanlon et al, Marshall 1, se ne sw 11-27-5e	*	2750
COWLEY COUNTY—		
George Hinkle, Townsite 1, se sw se 22-32-4e	210	3301
Deal Oil Co., St. Johns College 1, nw nw ne 27-32-4e	150	2378
ELK COUNTY—		
Denton et al, Douglas 1, nwc se ne 29-28-12e	*	1827
GREENWOOD COUNTY—		
Henderson-Holden, Harland 3, se nw nw 34-22-11e	40	1913
Theta Oil, Frankhouser 9, nwc sw 23-22-12e (owdd)	10	1712
Shull Drlg. Co. & Shell Pet., Johnson 3, se se nw 16-24-12e	4	1594
McPHERSON COUNTY—		
Mid-Kansas O&G, Kasey 1, swc ne nw 35-19-3w	¶¼-170	3047
Phillips & Palmer and Shell, Winn 3, cne sw nw 7-20-1w	280	3415
WOODSON COUNTY—		
Theta Oil, Schaffer 8, sw se se 31-23-14e	*	1758

New Operations

CHASE COUNTY—Leader et al, Techarna 1, nw se ne 13-16-13e.

COWLEY COUNTY—Roth et al, Reidy 4, nwc sw 32-31-8e. Roth et al, Fee 2, sw sw se 22-32-4e. Hinkle et al, Fuller 2, swc se 22-32-4e. Wakefield et al, Walnut Valley 1, nw se sw 22-32-4e. Sales et al, Cameron 1, nw ne sw 27-32-4e.

DICKINSON COUNTY—Severs, Livingood 1, se nw 13-13-2e (owdd).

ELK COUNTY—Croft & Morgan 1, cn½ ne se 26-31-10e.

GREENWOOD COUNTY—Davison, Curry 1, ne c nw 8-22-11e. Mathews & Rex, Reser 3, cne ne ne 7-24-12e.

HARVEY COUNTY—W. C. McBride, Inc., Friesen 3, nwc sw sw 20-22-3w.

McPHERSON COUNTY—Twin Drlg. Co. & Phillips Pet., Wiles 2, nwc sw ne 25-19-2w. Roland Oil Co., Thomas 1, ne c sw 26-19-2w (owdd). Vernon Oil Co., Lewis 1, se c sw 26-19-2w (owdd). All States Oil Co., Wall 2, se c sw 21-21-3w. All States Oil Company, Wall 3, swc se 21-21-3w. W. C. McBride, Inc., Neufeldt 2, nw ne nw 28-21-3w.

RENO COUNTY—Gled Oil, Skelly & Shell, Franz 1-A, ne c nw 2-24-4w.

Wildcat Drilling Report

(Wells shut down not included)

SUMNER COUNTY—Austin et al's Foy 1, sw se se 14-34-1w, sand 2830-85 ft, hfw td 2926 ft, running 8-in.

SEDGWICK COUNTY—Cameron & Great Basin's Landson 1, c se nw 13-28-2e, 6-in 2622 ft, chat 2950 ft, td 2975 ft, ur 6-in.

PRATT COUNTY—Ninnescah O&G's Hardesty 1, sw se se 28-27-11w, dr 2536 ft.

SEDGWICK COUNTY—Scroggins et al's Bartlett 1, nw se nw nw 35-27-1e, sd 1522 ft.

FORD COUNTY—Swain et al's Henthorn 1, cnw 21-25-24w, dr 5427 ft.

STAFFORD COUNTY — Stringer et al's Swindler 1, sw ne 2-25-11w, sp & sd.

EDWARDS COUNTY — Mid-Kansas' Converse 1, sw ne ne 30-24-18w, dr 4850 ft.

HARVEY COUNTY—Liggett et al's Davis 1, sw se ne 7-24-1e, base Miss. L. 3385 ft, sd 3415 ft.

FINNEY COUNTY—National Ref. Co.'s Wells 1, swc 13-23-30w, sd 5872 ft.

RICE COUNTY—Langston et al's Wells 1, ne se 4-20-9w, ru & sd.

MARION COUNTY—Darby et al's Pankratz 1, nw se 5-20-1e, dr 1755 ft.

COFFEE COUNTY—Baker et al's Hertiz 1, nw sw nw 31-20-14e, dr 1870 ft.

RUSH COUNTY—Barnsdall et al's Schultz 1, swc 3-19-16w, 3275-85 ft td, hfw, running 8-in.

BARTON COUNTY—Skelton Oil's Ott 1, c se se 16-19-14w, td 3604 ft, fsh.

McPHERSON COUNTY—Bailey-Carlson et al's Carlson 1, se c 4-19-3w, 12-in 1641 ft, dr 1675 ft.

MARION COUNTY—Detrick et al's Dalke 1, nw se 16-19-1e, 5-in 3312 ft, Wilcox 3410 ft hfw 3412 ft.

BARTON COUNTY—Smith, Ash et al's Wilson 1, c nw sw 13-18-14w, dr 1165 ft. Doherty et al's Roesler 1, sw ne 11-18-11w, 10-in 1910 ft, td 1974 ft, sd.

ELLSWORTH COUNTY—Leo Morgan et al's Andrews 1, ne sw 3-17-8e, 12-in 1010 ft, dr 1060 ft.

MORRIS COUNTY—Urschel et al's Bersuch 1, c nw se nw 10-17-7e, dr 1270 ft.

ELLSWORTH COUNTY—Phillips' Hockman 1, ne nw se 17-16-7w, dr 1758 ft. Viking Oil's Satran 1, cnw sw 5-14-9w, sg 1285-90 ft, td 1385 ft, sd. Beckford's Burke 1, cne sw 14-14-9w, lcn, moving in machine. Gurley Bros. & Barnsdall's Union Pacific 1, nw sw 7-14-7w, 15-in 457 ft, 12-in 740 ft, td 755 ft, w.o.c.s. Walker Oil's Remley 1, sw se ne 23-14-7w, 8-in 2995 ft, hfw 3045 ft, dr 3050 ft.

DOUGLAS COUNTY—Pure Oil's Lemb 1, nw se 31-14-19e, wx 1919-25 ft, td, hfw, sd for orders.

DICKINSON COUNTY—Severs et al's Livingood 1, se nw 13-13-2e (owdd) dr 4810 ft.

GRAHAM COUNTY — Scheimeyer et al's Smith 1, se c 24-8-25w, dr 2600 ft.

LEAVENWORTH COUNTY—West et al's Korb 1, cwn ne 32-10-21e, td 928 ft, ur 6-in.

EAST CENTRAL TEXAS

Conroe Competition Adds to Difficulty of Getting Line Connections. Wildcatters Maintain Their Numbers.

H. H. KING, *Staff Representative, Fort Worth, Texas*

Prospecting in Woodbine Sand Belt Increases

Tyler, Texas.—The volume of wildcat activity scattered over the full length of the Woodbine sand belt in East Texas is now sufficient to place several tests at a decisive level each week. Additions to the list have exceeded failures for several months. Operators and representatives of companies keeping tab on this exploration work in anticipation of a successful strike are kept on the jump to be present when the interesting tests penetrate the Woodbine horizon. Two deep tests in Anderson and Cherokee Counties were ordered plugged last week after testing salt water in the Woodbine sand horizon, and several others advanced to the decisive stage.

J. Alvin Gardner and Roy C. Ling's wildcat on the J. Leonard 53½-acre lease, Philip Mason Survey, Van Zandt County, encountered the top of the Woodbine series at about 4240 feet, with a surface elevation of 511 feet, and was coring below 4300 feet in dry formation on latest report. This test is about 2¾ miles northwest of the Van field. A decision on its production possibilities is due within the next 100 feet of new hole.

Kaufman County offered an interesting wildcat drilled about four miles north of Elmo by Geo. H. Anderson, Maurice Grubb and associates on the W. W. Moody 308-acre tract, H. G. Hider Survey. Moody 1 logged Austin chalk at 2377-2580 feet, with a surface elevation of 510 feet. The rotary was logging sandy-shale at 3146 feet.

Paul L. Meaders of Tyler and others have contracted to drill a Woodbine test about five miles to the southeast of the above wildcat on a block of about 6400 acres. This block straddles the Kaufman-Van Zandt County line, centering on the Wm. H. McBee Survey. The location will be in the Cedar Grove community.

Tom Nash of Dallas and associates are to start a Woodbine sand test on a 6000-acre block, centering on the Mary Gilbreath Survey, located on a line between Terrell and Kaufman.

The New Salem community, located in southwest Rusk County, is to receive a Woodbine test about one mile east of town through the efforts of Fred W. Shields et al, who have made location in the northwest corner of the R. L. Buckner 320-acre tract and also of the John E. Davis Survey. These operators have a 3300-acre block, and were given a dry hole contribution by Cranfill-Reynolds Company. The latter originally intended to drill this structure, which involves a cross faulting along the east shore line of the Sabine Basin.

A thin Pecan chalk section was encountered by the Leon County wildcat of Shell Petroleum Corporation and seven other companies and individuals on the Wm. Phillips 164-acre tract, E. A. Swayze Survey. This test logged the chalk at 4135-4200 feet, with a surface elevation of 423 feet, and at last account was drilling in lower Taylor at 4284 feet. This is one of the most extensively geologized blocks under going development, and also takes high honors in cost. Core drill and geophysical information indicates a deep seated dome condition. This block of about 17,500 acres was originally leased about three years ago by J. R. Black, Dallas producer and contractor, and the late Robt. R. Penn, and a half interest was sold to Shell Petroleum Corporation. Black has retained a one-sixteenth interest, and the Penn Oil Company has a one-eighth interest. Other interest owners includes: Humble Oil & Refining Company, Frank Buttram, Darby Petroleum Company, Gardner Petroleum Company and Westland Oil Company.

Service Drilling & Royalty Corporation and Jack Frazier's wildcat on the H. L. Hudson tract, M. Rionda Survey, Anderson County, plugged in lower Woodbine sand showing salt water at a total depth of 5124 feet. Cherokee County added another deep failure when Marr Drilling Company and Stanolind Oil & Gas Company's Green 1, A. B. Kelker Survey, quit in red beds at 5012 feet.

In Henderson County, Clint W. Murchison and D. S. Golding's S. G. Benton 1, E. G. Reynolds Survey, topped the Woodbine series at 4404 feet and first red beds at 4480 feet. The hole proved dry on drill stem test at 4481 feet. The formation was logged as red beds while drilling at 4695 feet. It has a surface elevation of 449 feet.

A second wildcat test for the Harper area, Franklin County, where prospects of a new oil pool from the Woodbine horizon on an established fault are considered reasonably good, was about to materialize late last week through the joint efforts of Bob Peveto, Fred Prince, Smith and Pink Chandler. This group received acreage donations to form a small block, and have made tentative location in the southwest corner of the south 40-acres donated by Kirby Petroleum Company out of 57.7-acre tract, D. S. Rogers Survey. This proposed test is only a short distance north of McGee-Harper-Mills-Ashby et al's Harper 1, W. N. Dawson Survey, where a small show of oil has later developed since the hole yielded salt water on bailing test given September 12 in Woodbine sand at about 3400 feet. Public subscription financed a Haliburton service crew to run test plug for locating casing leak, and it was revealed that the 6⅝-inch pipe is badly split above the sand. A string of 5 3/16-inch pipe is to be set for a re-test of the Woodbine.

Recovery of additional oil saturated sand from the Bowie County wildcat of J. M. Burnham-Marr-Robinson and Greer on the F. O. Weiss tract, J. Dean Survey, in core taken at 3757-61 feet may result in these operators undertaking a second test on their 10,000-acre block regardless of the outcome of the first test. Weiss 1 yielded an oil saturated sand in core taken in the lower section of the Trinity series at 3722-28 feet early in August. Drill stem test yielded salt water, and water also showed in several other tests that followed the deepening of the hole. The drill stem test that followed the coring of thin layer of sand showing oil saturation between 3751-61 feet yielded show of gas and traces of live oil with water. The hole has since been deepened below 3775 feet.

Purchases Stopped; Wells Left Without Connections

Tyler, Texas. — Completed oil wells in the East Texas field shut in for pipe line connections were slightly increased last week through several independent refineries on the Texas Gulf Coast having discontinued purchases in the above area in order to take advantage of more attractive priced crude of equal grade and quality now offered by operators in the Conroe field, Montgomery County. There are approximately 150 oil wells awaiting pipe line connections in the East Texas field, and the total is expected to increase until the well allowable is reduced to a level that will balance output with market demand.

East Texas Water Wells Total 141; Encroachment Continues

H. H. KING
Staff Representative

Tyler, Texas.—The East Texas oil field has 141 completed wells making salt water with oil production, or would yield water if placed in operation. Encroachment of water upon the northwest and west flanks of the field has been in evidence since the development of structurally low leases, and is registering a moderate rate of expansion, but not in menacing proportions. More additions have been made to the list of wells making water through operators and companies venturing out to the extreme edge of the structure with their drilling than has resulted from the normal advance of the water table upon the field. Proration violators have also added to the quota in recent months through the pulling in of bottom hole water upon release of back pressure normally held on the Woodbine sand producers.

Gregg and Upshur Counties have shown the greatest gain in number of wells making water due to development of edge leases in doubtful territory. In recent months the west border of Gregg County has been the scene of considerable activity that was launched with a view of realizing a return on investments before water floods the area. Advance of the water table from the west and northwest is to be expected as oil and gas drainage occurs in the main section of the field.

There are 24 wells accounted for as having previously made salt water, but are now making pipe line oil through having plugged back, or due to natural tendency of the producing horizon to build up pressure when kept under orderly production schedules. Rusk County is credited with 15 wells that formerly made bottom hole water, while five are located in Gregg County.

Plugging back operations have been completed on 42 wells that made water, or were believed to be in danger of developing water troubles. It is of interest to note that 14 of this number proved successful in eliminating the water. It has been proven by experience that plugging off water is not successful if the well is later exposed to open flow conditions, or if located in a heavily drained area.

The east edge of the field is immune from bottom hole water, except in several instances where water of a doubtful source has put in its appearance. It has been determined that most of the wells making water on the east edge have defective casing, and that the intrusion can be checked by running an extra string of pipe, or set tubing with a packer. The Kilgore area has developed a few water wells on the east

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Water Wells in East Texas Field

Cherokee County

Owner—	Elev.	Producing Horizon	Total Depth	Sub-sea Total Depth	Date Completed	REMARKS
Lee Davis & Hoffman's Annie Kelly 1	360	3675-3681	3681	3321	7-30-32	Shut in 25 per cent bs and w
C. L. Tubbs et al's J. H. Sharp 1	404	3721-3722	3722	3318	6-25-32	Shut in 10 per cent bs and w

Gregg County

Badgett & Ward's Samples-Holland 1	377	3697-3701	3701	3324	12-11-31	Dead
F. A. Bates (Harper-Neff's) E. T. Cole 1	266	3558-3573	3603	3337	5-29-31	3 per cent bs and w after pb
Continental Oil Co.'s C. C. Crews 1	361	3687-3689	3689	3328	5-15-31	4 per cent bs and w
C. C. Crews 4	337	3666-3668	3674	3337	11-13-31	4 per cent bs and w after pb
Deep Rock Oil Co.'s A. Z. Jeffrey 1	434	3745-3751	3751	3317	10-22-31	29 per cent bs and w
Flanagan Prod. Co.'s W. B. Walker-Tidal 1	272	3599-3601	3604	3332	10-18-31	30 per cent bs and w on pump pb
Iowa-Payne Oil Co.'s W. B. Walker 1	380	3693-3702	3702	3322	6-17-31	25 per cent bs and w
Magnolia Pet. Co.'s M. T. Cole 1	262	3584-3586	3586	3324	6-28-31	30 per cent bs and w
Mazda Oil Corp.'s M. M. Cotton 1	328	3651-3670	3670	3342	5- 3-31	7 per cent bs and w
Octogan Oil Co. (Searight's) J. M. Blackman-Shell 1	374	3688-3691	3691	3317	8-21-31	3 per cent bs and w
Louis Sikes et al's F. E. Stancil 1	406	3683-3718	3718	3312	9-28-31	1 per cent bs and w
Sinclair Prairie Oil Co.'s M. T. Cole 1	332	3647-3660	3660	3328	4-26-31	1 per cent bs and w
M. T. Cole 5	262	3584-3586	3586	3324	6-30-31	Now clear
M. T. Cole 23	293	3614-3620	3620	3327	6-15-32	Making water
Stanolind-Simms Oil Co.'s A. W. Miller 1	274	3585-3599	3609	3333	11-15-31	None after PB was 100% water
Sun Oil Co.'s E. L. Walker 1	390	3705-3718	3718	3328	8-21-31	Pumping 81 per cent bs and w
The Texas Co.'s J. Waddell 1	391	3661-3684	3684	3293	12-12-31	Now clear was 5 per cent
Winston Oil Co.'s Paul Jones 2	368	3657-3660	3684	3316	10- 5-31	None after PB was 30 per cent
Wise-Jackson et al's Wash Dickey 1	376	3692-3696	3696	3320	5-12-31	15 per cent bs and w
Abernathy-T. A. Johnson et al's A. M. Greggston 1	279	3552-3578	3578	3299	4-20-32	60 per cent bs and w on pump
Allender & Rasmussen's J. M. Dickson 1	378	3695-3709	3709	3331	6- 6-32	Making salt water
Atlantic Oil Prod. Co.'s J. W. Bacle	399	3646-3675	3702	3303	9-2 -32	No water, but pb
Cranfill-Reynolds Co.'s Blackman-King 1	319	3595-3630	3630	3311	4-10-31	2 per cent bs and w
Burnham & Johnson's Jackson-Sample 1	430	3764-3765	3765	3335	6- 7-32	45 per cent bs and w
Central Commercial Oil Co.'s King-Shell 1	381	3709-3712	3712	3331	2-13-32	27 per cent bs and w
Deininger-Moore-Zilkey's C. G. Strong 1	454	3765-3777	3777	3323	5-10-32	15 per cent bs and w
Paul Doran et al's Jackson-Sample 1	425	3747-3749	3749	3324	3-25-32	14 per cent bs and w
Elzey Drilling Co.'s H. C. McNeely 1	397	3719-3721	3721	3324	5-11-32	Making water
Jack Greenwood (Travis-Wair's) M. Loughridge 1	409	3722-3728	3728	3319	2- 9-32	35 per cent bs and w
East Texas Oil Ref. Co.'s E. Sample 1	419	3720-3724	3724	3305	8-29-31	4 per cent bs and w
B. M. Hester et al's C. C. Crews 1	350	3681-3685	3685	3335	3-23-32	Dead
Jas. B. Hughes-Pollock's A. A. King 2	395	3703-3705	3705	3310	4-18-32	2 per cent bs and w

(Continued on next page)

Water Wells in East Texas Field

Owner—	Elev.	Producing Horizon	Total Depth	Sub-sea Total Depth	Date Completed	REMARKS
Kniveton Oil Co.'s W. P. Crews 1	396	3706-3712	3712	3316	5-20-32	12 per cent bs and w
W. P. Crews 2	421	3728-3731	3731	3310	6- 6-32	15 per cent bs and w
K. E. Merren & Mays' J. S. Dansby 1	401	3701-3712	3712	3311	7-18-31	1 per cent bs and w
W. Hawkins 2	362	3642-3650	3650	3288	4- 5-32	19 per cent bs and w
Frank Russell et al's E. Duncan 1	345	3535-3586	3586	3241	7-26-32	Water from casing leak
Selby O&G Co.'s Snavely 1	278	3543-3595	3595	3317	6- 3-31	Making water
Tidal Oil Co.'s J. E. Choice 1	380	3694-3702	3702	3322	6-20-31	10 per cent bs and w on pump
Universal Oil Gas & Mining Co.'s I. Adkins 1	369	3697-3703	3703	3334	3-26-32	Shut in after pb
Wainwright-West Oils, Ltd's J. M. Martin 1	419	3743-3745	3745	3326	4-26-32	Shut in was 21 per cent bs and w
Welch & Sandler's Barnett-Tidal 1	434	3739-3743	3743	3321	3- 6-32	5 per cent bs and w
Barnett-Tidal 2	409	3726-3730	3730	3321	4- 3-32	2 per cent bs and w
Barnett-Tidal 3	419	3735-3736	3736	3317	7-20-32	Making water
Zenith Oil Co. (R. T. Dudney's) Clayburn 1	398	3709-3714	3714	3316	4-28-32	6 per cent bs and w
Rusk County						
H. L. Blackstock et al's W. P. Brightwell 1	371	3672-3684	3684	3313	3-29-31	Now clear
Brown-Wilson et al's M. R. Terrell 1	398	3712-3729	3729	3331	6-22-31	47 per cent bs and w
Burton Drilling Co. et al's E. B. S. Florey 1	350	3720-....	3729	3379	3-15-31	40 to 80 per cent bs and w
Cameron Oil Co.'s S. P. Warren 1	440	3762-3766	3766	3326	10- 6-31	30 per cent bs and w
Chas. Carroll & Taylor's J. P. Gibson 1	474	3780-3802	3802	3328	12-17-31	Making water on pump.
E. L. Chapman et al's O. Russell 1	338	3665-3668	3677	3339	6-23-31	45% bs&w after pb.
Crude Prod. Co.'s Joe Gipson 1	480	3803-3808	3808	3329	9-16-31	Dead, was 60% bs&w.
Droppleman Drl. Co.'s T. C. Warren 1	438	3758-3764	3775	3327	7-22-31	60% bs&w after pb
East Texas Ref. Co.'s O. H. Grissom 1	465	3726-3738	3748	3283	6- 6-31	2% bs&w after pb.
Dorcas Wills 1	378	3688-3693	3693	3315	4-25-31	2% bs&w.
Dorcas Wills 5	344	3672-3679	3692	3348	5-17-31	1.5% bs&w after pb.
Dorcas Wills 7	362	3656-3671	3671	3309	5-29-31	Clear.
H. W. Elliott et al's M. R. Terrell 1	428	3752-3755	3764	3336	5- 9-31	Dead after pb.
Everts Drl. Co. et al's P. C. Warren 1	501	3840-3842	3842	3341	12-21-31	4% bs&w
Goodgame & Eby's W. W. Holland 1	504	3815-3818	3832	3328	1- 4-32	75% bs&w on pump after pb.
Gulf Production Co.'s F. Birdsong 1	334	3557-3608	3661	3327	4- 8-31	Clear after pb.
W. Shaw 2-A	440	3738-3748	3759	3310	8- 1-31	8% bs&w after pb.
G. G. Turner 7	394	3641-3695	3701	3307	10-27-31	30% bs&w after pb
Geo. Guthrie et al's I. P. Perry 1	396	3700-3706	3706	3310	7-29-31	35 to 50% bs&w.
Humble O. & R. Co.'s L. D. Crim 7	366	3630-3645	3682	3316	4- 2-31	Clear after pb, was 5% bs&w
L. D. Crim 16	354	3610-3642	3642	3288	4-20-31	Clear, was 8% bs&w
Kangerga 7		3662-3696	3696		6- 8-31	Making water
S. S. Laird 5-A	364	3605-3624	3624	3260	10- 5-31	Making water, casing leak
Jackson & Eysenbach's D. Florence 1	381	3705-3707	3707	3326	5-12-32	Making water
K. & P. Oil Co.'s McNealy 1	380	3647-	3720	3340	4-25-31	Clear after pb, was 8% bs&w
McLester Drilling Co.'s J. Johnson 1	482	3782-3786	3786	3304	4-10-32	50% bs&w
Magnolia Pet. Co.'s E. F. Florey 1	335	3641-3647	3661	3312	4-10-31	20% bs&w after pb
W. B. Kee 1	473	3785-3786	3786	3313	4-29-32	Trace water after pb
C. L. McMahon et al's S. B. Wills 1	360	3657-3663	3663	3303	4-27-31	18% bs&w
M. & G. Oil Co.'s (now Murray Oil Co.) L. DeGuerin 1	518	3823-3828	3828	3310	11-28-31	35% bs&w
Minor 1	499	3810-3816	3816	3317	10-31-31	3% bs&w
Kee-Moore 1	494	3814-3816	3819	3325	11-15-31	60% bs&w on pump after pb
Moore 1	507	3822-3825	3825	3318	2- 1-32	60% bs&w
M. L. Priddy 1	505	3817-3818	3823	3318	10- 3-31	Dead, was 80% bs&w after pb
Teague 1	496	3809-3815	3815	3319	12- 3-31	7% bs&w
Mercury Pet. Co. et al's Sam Warren 1	435	3748-3753	3753	3318	2- 3-32	2% bs&w
Arch Page et al's J. D. Florey 1	492	3815-3817	3817	3325	1-13-32	Dead, was 25% bs&w
Albert Plummer et al's J. R. Beall 1	385	3699-3702	3702	3317	7-21-31	6% bs&w
M. Risinger et al's M. H. Barton 1	494	3808-3812	3812	3318	12- 8-31	50% bs&w
Royalty Pet. Corp.'s (Dearing) T. H. Goforth 1	484	3771-....	3787	3303	6-15-31	6% bs&w
Frank Russell et al's J. S. Powers 1	428	3757-3767	3767	3339	7-29-31	3% bs&w
Shell Pet. Corp.'s Dorcas Wills 1	349	3659-3661	3661	3312	4-21-31	20% bs&w
Dorcas Wills 4	320	3637-3642	3642	3322	10-28-31	10% bs&w
Snowden & McSweeney Co.'s Roy Laird 1	380	3597-3679	3687	3307	4-14-31	Clear after pb
Sinclair Prairie Oil Co.'s A. Kersh 1	349	3653-3664	3664	3315	5-21-32	Now clear
A. Kersh 2	341	3653-3656	3656	3315	6- 5-32	1 to 3% bs&w
W. D. Kinney 21	335	3616-3630	3666	3331	1-27-32	Clear after pb
Spider Oil Co.'s Florey-Neal 1	495	3812-3816	3836	3341	2-28-32	Dead after pb, was 15% bs&w
Stewart & Duffey's F. Gibson 1	525	3842-3844	3844	3319	2- 1-32	Dead, was 35% bs&w
H. O. Lawn 1	514	3830-3832	3832	3318	4- 1-32	Making water
Stanolind O & G Co.'s C. O. Christian 1	338	3657-3662	3664	3326	7-30-31	9% bs&w
R. Christian 1	360	3670-3676	3676	3316	7-30-31	Now clear
Ras Lacy 1	318	3604-3619	3666	3348	2-11-32	Gasser after pb from water
W. H. Smith 1	419	3758-3763	3763	3344	5-31-31	Now clear
State Production Co.'s J. C. Gipson 1	464	3789-3792	3792	3328	9-25-31	80% bs&w on pump
Sunbeam Oil Co.'s W. W. Brandon 1	495	3812-3817	3817	3322	12-17-31	90% bs&w, agitating
Sun Oil Co.'s Ed. Barker 1	430	3746-3748	3748	3318	5- 9-31	3% bs&w
Ed. Barker 2	370	3687-3689	3689	3319	7-22-32	10% bs&w

(Continued on next page)

Water Wells in East Texas Field

Owner—	Elev.	Producing Horizon	Total Depth	Sub-sea Total Depth	Date Completed	REMARKS
A. M. Sutton-Nivla Oil Corp.'s M. Wilson 1	474	3786-3788	3795	3321	9-16-31	35 to 50% bs&w after pb
W. B. Brandon 1	554	3889-3890	3890	3336	8-15-32	60% bs&w on pump
The Texas Co.'s W. T. Chappell 2	412	3732-3734	3734	3322	12-15-31	Now clear
Turman Oil Co.'s W. P. Brightwell 1-A	367	3640-3663	3723	3356	4-26-31	Clear after pb
W. P. Brightwell 3-B	369	3635-3641	3641	3272	5-24-31	Now clear
Tidal Oil Co.'s S. S. Laird 1	450	3673-3723	3723	3273	5-22-31	Trace water due to casing leak
Ward Oil Corp. et al's J. A. Beall 3	415	3725-3727	3727	3312	1-18-32	13% bs&w
British-American Oil Prod. Co.'s J. D. Stone 1	432	37 -3705	3730	3298	5-24-31	2% bs&w after pb
Ellzey Drilling Co.-E. Constantin's Deason 1	439	3620-3681	3681	3242	11-19-31	Now clear, was trace
Smith & Bohlssen's M. R. Terrell 2	..	....-....	3671	....		pb acct over-drilled
Smith County						
East Texas Ref. Co.'s Tyiska 1	523	3837-3845	3845	3322	5-19-31	40% bs&w
Walter H. Gant-Wagener's Sebe Stone 1	525	38 -3854	3861	3336	1- 8-32	1% bs&w after pb
J. E. Lucas et al's Negro Church 1	474	3791-3801	3801	3327	12-19-31	8% bs&w
Sartain 1	473	3794-3796	3807	3334	4-30-32	1½% bs&w after pb
Sinclair Prairie Oil Co.'s A. S. Jarvis 1-A	389	3698-3699	3710	3321	4-28-31	0.5% bs&w after pb
Mayfield 2-A	540	3843-3851	3851	3311	5-16-31	3% paraffin
Mayfield 14-A	468	3787-3789	3789	3321	4-18-32	20% bs&w
E. E. Moore 1	422	3728-3730	3745	3323	4-15-32	1% bs&w after pb
A. Wiley 1	537	3846-3853	3894	3357	5- 5-31	30% bs&w after pb
A. Wiley 7	488	3826-3828	3828	3340	6- 7-32	30% bs&w
Sun Oil Co.'s J. J. Denton 1	392	3687-3695	3695	3303	6- 5-31	7% bs&w
J. J. Denton 2	404	3708-3712	3712	3308	9- 9-31	7% bs&w
R. L. Henson 1	400	3711-3714	3714	3314	7-19-31	Now clear
J. D. Henson 2	373	3673-3682	3682	3309	8-30-31	Now clear
Cockburn & Hooker's L. A. Jackson 1	482	3810-3811	3811	3329	8-27-32	5% bs&w
H. Florence & Womack's S. S. Cook 1	459	3775-3778	3778	3319	4- 5-32	1% bs&w
S. S. Cook 2	497	3717-3820	3820	3323	5- 5-32	40% bs&w
T. A. Johnston & Owens' J. Jackson 1	443	37 -3749	3769	3326	4-28-32	Clear after pb
Long Drilling Co.'s G. A. Turner 1	506	3826-3829	3829	3323	1-14-32	35% bs&w
Eastex Loan & Inv. Co.'s S. S. Cook 1	..	....-....	....	3320	..-..-..	10% bs&w
E. M. Thomason-Rasmusen's Cook 1	485	3803-3808	3808	3323	5-14-32	9% bs&w
Sentinel Oil Corp.'s S. S. Cook 1	431	3743-3747	3747	3316	2- 8-32	5% bs&w
Upshur County						
Alma Pet. Corp.'s J. W. L. Younce 1	349	3630-3668	3668	3319	8-23-31	4% bs&w
Arcadia Ref. Co.-Dumas' A. O. Phillips 1	367	3646-3665	3665	3298	9-17-31	Now clear
H. W. Black-Case et al's I. M. Burroughs 1	392	3700-3708	3708	3316	12- 4-31	6% bs&w
California Pet. Corp.'s D. Culpepper 1	439	3742-3761	3761	3322	11-28-31	25% bs&w
J. W. Clark (Pelican) et al's E. H. Hamilton 1	434	3756-3762	3762	3328	7-30-31	20% bs&w
Cranfill-Reynolds Co. et al's M. L. Rash 1	332	3709-3729	3729	3397	1-29-32	50% bs&w
Galvez Oil Corp.'s Moore 1	415	3690-3721	3721	3306	1- 4-32	15% bs&w
Glasscock Bros. et al's East Mt. School 1	446	3753-3759	3759	3313	3- 6-32	?% bs&w
Humble (now Sam Dorfman)'s Eva O'Byrne 1-C	420	3725-3735	3735	3315	10-12-31	0.3% bs&w
Humble O. & R. Co.'s C. T. Shelton 1	420	3715-3739	3739	3319	11-30-31	Dry and aban after pb
Humble (now C. L. Brown)'s D. C. Shelton 1	426	3727-3732	3742	3316	12-11-31	0.5% bs&w
Jay-Kay Oil Co.'s Victory 1	375	3679-3686	3686	3311	11-25-31	6% bs&w
J. A. Johnson et al's John Hargraves 1	406	3709-3712	3712	3306	10-30-31	19% bs&w
J. F. Murphy et al's A. J. Watkins 1	407	3703-3719	3719	3312	9- 8-31	3% bs&w
W. H. Peckham Oil Co.'s J. W. Free (10-ac) 1	431	3740-3750	3750	3319	11-30-31	7% bs&w
W. F. Sorrells & Owens' A. N. Brawley 1	438	3746-3753	3753	3315	2- 9-32	7% bs&w
J. W. Free 1	371	3680-3695	3695	3324	6-27-32	Making water
M. Taxman et al's A. Callahan 1	408	3704-3719	3724	3316	7- 4-31	50% bs&w (dead) after pb
Trico Oil Co.'s A. D. Adkins 1	456	3749-3765	3765	3309	10-29-31	0.5% bs&w
East Mt. School 1	444	3736-3747	3766	3322	12-16-31	5% bs&w after pb
Ty-Tex Oil & Dev. Co. et al's S. F. Kay 1	316	3648-3669	3669	3353	11-10-31	Dead, was 70% bs&w on P.
R. M. Weaver Est.-Alexander et al's L. J. Everett 1	296	3612-3617	3617	3321	6-27-31	87% bs&w
P. C. Dean & A. Adkisson's O. M. Victory 3	330	3619-3636	3636	3306	7-23-32	2% bs&w on pump
A. & D. Oil Co.'s J. W. Free 1	410	3700-3727	3727	3317	2-17-32	12% bs&w
Flanagan & Bazzell's J. H. Thomas 1	270	3575-3585	3618	3348	5-28-32	No water, but pb
Magnolia Pet. Co.'s R. A. Adkins 7	419	3718-3732	3732	3313	12-30-31	Making water
J. D. Reynolds & Cox's L. B. Miller-Humble 1	466	3760-3799	3799	3333	8- 1-32	50% bs&w
Saturn Oil Co.'s W. F. Smith 1	403	3688-3701	3716	3313	6- -32	7 bbls oil, 3 bbls water after pb
Service Dr. & Roy Corp.'s Free-Humble 3	356	3678-3683	3683	3327	8-18-32	30% bs&w
The Texas Co.'s H. L. Phillips 3	386	3703-3707	3707	3321	6-19-32	20% bs&w on pump
C. L. Wickliffe et al's Florence 1	441	3754-3768	3768	3327	7- 5-32	Dry and abn after pb
The Texas Co.'s J. Williams 1	362	3681-3683	3683	3321	8-13-32	Making water
Faith Oil Corp.'s E. H. Brawley 1	341	3657-3661	3661	3320	6-14-32	10% bs&w

East Texas Water Wells Total 141; Encroachment Continues

(Continued from page 50)

side that yield brackish water with the oil. Humble Oil & Refining Company's S. S. Laird 5-A, located in the southeast corner of the I. Ruddle survey, Rusk County, recently developed water while flowing its allowable. It is reported that an analysis of this water showed it similar to bottom hole water found on the opposite side of the area, and further investigation is to be made. Establishment of proof that it is bottom hole water and not a casing leak would materially alter all accepted theories on the water situation. Several other east side wells are listed on the accompanying water well report, with notations that casing trouble is the probable source.

The Overton townsite area, Rusk County, has been swept by the rise of the water table to a large extent. Former violators of proration in this area have aggravated the situation in causing a coning condition, and dissipation of the flowing pressure on a number of drilling sites. Many of the early water wells have since switched to standard rigs to pump the fluid as result of the passing of the flowing life of the producers.

The current volume of water produced with oil in the field is estimated at less than 5000 barrels daily due to the allowable having been kept at a low figure for some months. One of the largest water wells is the pumper operated by Sun Oil Company on the Walker lease, Gregg County. This outpost well is handling about 270 barrels of fluid to obtain its 43 barrels oil allowable, and is pumped continually on a short stroke to try and avoid aggravating the water situation. This pumper has been handling about 80 per cent water since last December, and has always yielded its oil allowable.

Individual pits for accumulating the salt water production as it is separated from the oil by chemicals have been provided by well owners. The production is easily handled in this manner without creating a stream pollution hazard, but when the number of wells increase to a sizeable figure it will probably require the installation of community water disposal plants. Preliminary investigations toward salt water disposal units on a large scale have been conducted in the past, but abandoned without any definite suggestions since their requirement has been indefinitely postponed through limiting the proration allowance of the field.

East Texas Output Over Two Million in Three Years

Tyler, Texas.—The East Texas oil field enters into its third year on October 3 with considerable more than two hundred million barrels of production to its credit and approximately 8250 producing wells. The productive area is estimated at close to 115,000 acres with a maximum length of 40 miles and the widest point is about nine miles across.

Drilling of several thousand additional wells within the field which is considered defined on all sides, is quite probable.

A third dry hole within the borders of production in the field near the Pine Hill community, Gregg County, is threatened by Tidal Oil Company's Castleberry 14 which failed to find sufficient saturation in hard, broken sand logged at 3631 to 3639 feet. Drilling was halted in shale at 3666 feet. This test is east of failures drilled by Arkansas Fuel Oil Company and Columbia Oil & Gas Company some months ago. There is only one other spot in the field proper that yielded failures in what ordinarily should be proven territory.

A minor extension to the Rusk County portion of the field came through completion of Sun Oil Company's A. Lee 2, northwest portion of the Peter Tipps survey, flowing 43 barrels oil hourly, open two-inch tubing, from sand at 3657-3662 feet. This well has a sub-sea depth of 3310 feet, and it is three-quarters of a mile due east of a dry hole.

The extreme east edge of the Joiner area contributed a pumper completion when Stovall Drilling Company's J. P. Maxwell 1, I. G. Parker survey, failed to flow when tested in broken sand at 3611-3715 feet. This outpost swabbed 50 barrels daily on initial test.

Hampton and Hazlip, Tyler operators, completed their G. H. Morris 3, located in southeast corner of lease and on the east edge of the W. R. Cooke survey, north flowing 75 barrels oil hourly via three quarter-inch choke on tubing from sand at 3642 feet. This well has a sub-sea depth of 3315 feet. These operators obtained the lease, bearing a producer and a dry hole, last June from Gulf Production Company for a $50,000 oil payment. Shell Petroleum Corporation has farmed out the undrilled portion of its T. H. Gill lease, R. W. Smith survey, located less than half mile to the east of the above property, to Barnsdall Oil Company, which is to take care of all offsets. Shell has retained five acres surrounding each of its three wells on the Gill tract, and will receive one quarter over-riding royalty for flowing and one eighth for pumping production developed by Barnsdall Oil Company. The first location under this arrangement has been staked in the northeast corner of the lease.

Shell Petroleum Corporation has also farmed out a small lease consisting of the south end of its Jas. Moore 350-acre lease, F. W. Johnson survey, Gregg County, on an over-riding royalty basis. C. A. Lester and Duffield assumed responsibility for the development, and made their first 330 feet from the west line and due south of Shell's Moore 18. Close relationship of the producing horizon to the established water level probably induced Shell to dispose of the south portion of its lease.

Texas Association Proposes Lower Output in East Texas

Dallas, Texas.—Directors of the Texas Oil & Gas Conservation Association launched a movement toward the placing of the East Texas oil field on a lower production allowable at a meeting held here on the afternoon of September 27. A petition calling upon the Texas Railroad Commission to authorize a hearing to be held with a view of lowering the field's allowable from its present top level of 375,000 barrels daily was signed and submitted to the commission. Chas. F. Roeser, Fort Worth producer and president of the association, presided at the meeting.

In requesting the commission to act promptly on the East Texas situation, the petition stated that the present allowable is causing physical waste by reason of an excessive drop in bottom hole pressure and manner of water encroachment. No suggestions were offered as to the production level necessary to alleviate the physical waste alleged to be taking place while the high allowable is in effect, but the producers and royalty owners included on the board of directors of the association will be prepared to offer expert testimony at the requested hearing to substantiate their claims of waste occurring in the field.

Considerable discussion was devoted to tax evasion within the state. It was stated that steps have been taken by the state to work in conjunction with the federal government in corraling refiners and dealers that fail to pay their full tax on all gasoline sold for automobile consumption.

The drilling of unnecessary wells in the East Texas oil field was protested at the meeting. Steady addition of a large quota of new wells each week in the East Texas oil field forces the lowering of the well allowable at regular intervals to take care of the additions. Suspension of drilling will be necessary before the danger of continued reductions passes.

Central East Texas Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
JOINER AREA—		
Amerada Pet. Corp.-Deep Rock Oil Co., Stovall 9	6000	3634
Arkansas Fuel Oil Co., G. Ferguson (74-ac) 5	9000	3653
Aston Oil Co., J. R. Alford (47-ac) 7	7200	3691
Belrice Oil Co., C. Young (40-ac) 2	8600	3700
Combined Oil Interests, G. W. Eaton 11	†	3671
G. W. Eaton 11-A	10,500	3717
Cron & Gracey, Pete Tipps 1	2500	3677
R. H. Dearing & Sons (Royal Pet. Corp.), T. H. Goforth (18-ac) 3	8600	3807
R. W. Fair Oil Co., Fee (28-ac) 4	9000	3646
Ford-Sample & Smith (was Pharis & Sample) Deason (8-ac) 2	4000	3712
Gulf Prod. Co., G. G. Turner (312-ac) 17	8000	3735
Hart Pet. Co., J. R. Alford 2, blk. 32	6000	3659
O. L. Hastings & Dodson, E. B. Alford (5-ac) 1, Blk. 27	600	3650
W. B. Hinton et al, Mayfield (94-ac) 9	8400	3815
Humble O&R Co., J. W. Turner (104½-ac) 11	9000	3801
A. Wilson (58.61-ac) 3	8500	3732
H. L. Hunt Prod. Co., W. P. Moore (82-ac) 7	12,000	3640
Jenkins Oil Corp.-Consolidated & Hamilton, Jobe (109-ac) 9	1500	3678
Louisiana Oil Ref. Corp., H. Kersh (79-ac) 1	10,000	3639
John E. Mabee, Inc., E. A. Thrash (17-ac) 3	7200	3692
McClanahan & Venable Oil Co., J. A. Birdwell (149-ac) 11	10,000	3632
McMurrey Bros. et al, A. D. Blackwell (42-ac) 4	7000	3705
Mid-Kansas O&G Co., M. M. Cross 41	7500	3615
M. C. DeGuerin (158-ac) 6	8400	3691
W. T. Grissom (842-ac) 25	9000	3658
M. A. Price (201-ac) 9	4000	3651
M. A. Price (201-ac) 10	2500	3641
J. H. Sharpe (482.67-ac) 15	4500	3697
Pansy Oil Co., J. Minschew (14-ac) 2	5000	3793
Geo. W. Ray (was R. M. V. Oil Co.), L. J. Pinkston (75-ac) 3	9600	3634
Yandell Rogers et al, D. M. Bradford (7-ac) 2	2500	3678
Sinclair Prairie Oil Co., F. B. Wilson (124-ac) 7	12,000	3660
Stanolind O&G Co.-Pure Oil Co., W. H. Siler (949.6-ac) 19	9000	3632
W. H. Siler 24	10,000	3666
W. H. Siler 27	8500	3674
W. H. Siler 28	2000	3703
W. H. Siler 30	8500	3679
W. H. Siler 33	9600	3688
Stovall Drlg. Co., Maxwell (8-ac) 1	100	3715
Sun Oil Co., A. Lee (147-ac) 2	2000	3662
KILGORE AREA—		
Abernathy & Ashton, Randolph 2	9600	3554
Atlantic Oil Prod. Co., S. G. Andrews (110-ac) 7-A	10,000	3609
Atlantic-Byrd & Frost, Inc., W. Smith (43-ac) 5	9000	3567
L. C. Collins et al, M. H. Bivens-Shell (25-ac) 2-B	9500	3686
East Texas Oil Ref. Co., D. Wills (83-ac) 4	9600	3649
R. W. Fair & Thompson, D. Carr-Shell (53-ac) 1	6500	3486
Gulf Prod. Co., Grif Davis (50-ac) 4	8000	3579
S. Hilburn 30	10,000	3550
M. B. Hughey (50-ac) 5	9500	3534
Hawkeye Pet. Corp., W. Smith 3	9600	3607
Humble O&R Co., W. D. Peterson (100-ac) 2	6500	3648
Henry Sexton (200-ac) 8-B	10,000	3754
Jones-O'Brien, Inc., M. B. Hughey-Ross (127-ac) 7	10,000	3531
Sid Latham, Rec. (O. R. Cooper), J. C. Clayborn (25-ac) 2	6500	3724
E. R. Liner, Inc., J. C. Clayborn (31-ac) 3-F	8500	3687
Manahan Oil Co. (was Danciger O&R Co.), N. Bean (25-ac) 4	12,000	3652
Max Rubin & Nadel, D. Wills-Shell 2	7000	3647
Russell Pet. Corp., M. T. Cole 1	1500	3592
C. C. Crews (122-ac) 1-B	*	4008
Silver Star Oil Co., P. Howard 1	9600	3562
Simplex Oil Co., J. E. Lawther (35-ac) 2	7500	3594
Stanolind O&G Co., W. H. Smith (97-ac) 4	7000	3726
Sun Oil Co.-Texas Seaboard Oil Co., J. N. Campbell (107-ac) 4	7200	3555
M. T. Cole (264-ac) 13	9600	3562
The Texas Co., M. T. Cole (220-ac) 10	8000	3554
LONGVIEW AREA—		
Arcadia Ref. Co., A. O. Phillips (25.2-ac) 3	1000	3661
Atlantic Oil Prod. Co., W. P. Duncan (154.7-ac) 9	9500	3662
Atlantic-Sun Oil Co., R. C. Barnwell (49-ac) 4-B	9000	3505
M. Hays (448-ac) 28	10,000	3523
Bishop Corp., J. H. Thomas (50-ac) 1	*	3663
Champlin-Bass, Inc., E. H. Brawley (58-ac) 1	6500	3637
Cranfill-Reynolds Co., R. C. Barnswell (50-ac) 6-A	8000	3525
Empire Gas & Fuel Co., J. W. Akin (100-ac) 6	9000	3605
J. C. Bumpas (68-ac) 6	9200	3555
L. A. Jeter (121-ac) 10	8500	3568
Fain-McGaha Oil Corp., A. Tooke (100-ac) 6	15,000	3648
Galvez Oil Corp., W. W. Holland (45-ac) 5	11,000	3649
Gulf Prod. Co., M. O. Sheppard (335-ac) 20	9600	3510
Humble O&R Co., J. M. Adams (100-ac) 2	7500	3472
W. R. Hughes (185-ac) 12	10,000	3679
Eve O'Byrne (125-ac) 4-B	7000	3748
Island Oil Co., J. W. Akin (36-ac) 3	11,000	3566
C. A. Lester & Duffield, Graves-Shell (80-ac) 3	8000	3644
Capt. J. F. Lucey, Rec. (Jos. M. Ross), Anderson 1	10,500	3565
Magnolia Pet. Co., Hobart Keys (64-ac) 5	10,000	3640
T. B. Stinchcomb-Todd (111-ac) 6	9600	3555
T. B. Stinchcomb-Todd (111-ac) 7	11,000	3527
J. R. Patty et al, McComic 1	25	3617
Shell Pet. Corp., A. N. & V. King (160-ac) 7	7600	3630
E. A. Showers & W. A. Moncrief, M. O. Sheppard (21-ac) 3	9500	3525
Simms Oil Co.-Leon Russ, Flewellen (200-ac) 7	8400	3711
E. L. Smith Oil Co., E. A. Watts (100-ac) 1	600	3656
Stanolind O&G Co.-Simms-Conoco, Flewellen (400-ac) 7-C	8000	3680
Sun Oil Co., J. C. Gray (101-ac) 7	50	3687
Sun-Texas Seaboard Oil Co., J. M. Haynes (202-ac) 7	11,000	3627
J. Rollins (87-ac) 3	12,000	3640
The Texas Co., John Waddell (27-ac) 4	8000	3665
Tidal Oil Co., Lake Devernia (270-ac) 17	14,000	3530
Twin Oil Co., M. Bonner (148-ac) 2	6000	3664
J. O. Whittington et al, J. C. Bumpas (31-ac) 4	8400	3575
Yount-Lee Oil Co., J. D. Davis (80-ac) 6-A	9600	3554
VAN FIELD—		
Pure Oil Co., A. R. Humphreys (100-ac) 3	8500	2942
I. D. Miller (60-ac) 5	10,000	2958
P. E. Neill (86-ac) 3	150	2927
Shell Pet. Corp., I. P. Tunnell (25-ac) 7	9600	2945

ABBREVIATIONS

NOTE—The following is the explanation of abbreviations, signs, etc., used in completion and wildcat reports: *—dry hole, abandoned well; ‡—salt water; †—junked and abandoned; ¶—million feet of gas; abn—abandoned; bbls.—barrels; b.s.—basic sediment; cas—casing; co—cleaning out; dk—derrick; dr—drilling; fsh—fishing; ft—feet; in.—inches; lcn—location; m—milling; n, s, e, w—north, south, east, west; r—reaming; sd—shut down; sdtr—sidetracking; sp—spudding; sr—straight reaming; std—standardizing; sw—salt water; td—total depth; ur—underreaming; wo—workover; woc—waiting for cement to set; wosr—waiting on standard rig.

East Texas Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
ANDERSON COUNTY—		
Service Drl. & Royalty Corp. & Jack Frazier, Hudson 1	*	5124
CHEROKEE COUNTY—		
Marr Drl. Co. & Stanolind O&G Co., E. W. Green 1	*	5012
Wm. A. Stone & W. L. Pierson, Perkins 1	*	3123

Wildcat Drilling Report

(Wells Shutdown not included)

ANDERSON COUNTY—W. H. "Bill" Roeser et al's M. A. Davey 1, P. G. Adams sur dk. Service Drl. & Royalty Corp. & Jack W. Frazier's H. L. Hudson (198-ac) 1, M. Rionda sur elev 373 ft, Pecan chalk 2927-3075 ft, Austin chalk 4130-4472 ft, salt water in Woodbine topped at 4837 ft, top red beds 5094 ft, dry and abn in water 5124 ft.

BOWIE COUNTY—Roy E. Anderson et al's A. Y. Breckenridge (464-ac) 1, M. Dykes sur, elev 352 ft, top Nacatoch 775 ft, top Saratoga chalk 1180 ft, Pecan chalk 1362-1805 ft, dr sandy-shale 2555 ft. J. M. Burnham-M. H. Marr-J. B. Greer-C. W. Robinson et al's F. O. Weiss (949-ac) 1, J. Dean sur, elev 388 ft, anhydrite 2945-3030 ft, tested salt water in Trinity at 3710-28; 3717-28; 3757-62; and 3756-64 ft, coring sand 3775 ft. W. S. Langford et al's W. W. Whybark (100-ac) 1, J. H. Dyer sur, co 2075 ft.

CASS COUNTY—Lapan-Lovejoy et al's S. A. Orr (320-ac) 1, G. W. Morris sur, dk.

CHEROKEE COUNTY—Barclay-Taite & Deason's A. T. O'Neal (13-ac) 1, J. M. Procella sur, dk. Bridges-Chandler et al's Berryman (300-ac) 1, H. Kimble-Dean sur, sd 1000 ft. Saranac Oil Co.'s Dr. P. E. Jones (132) 1, J. D. Hamilton sur, rig. Pure Oil Co.'s W. P. Nicholson (70-ac) 1, R. Stewart sur, elev 455.2 ft, top Pecan chalk 3172 ft, dr chalk 3460 ft. Stanolind O&G Co.-Marr Drl. Co.'s E. W. Green (100-ac) 1, A. B. Kelker sur, elev 546 ft, Pecan chalk 3755-3987 ft, Austin 4625-4802 ft, dry and abn in red beds 5012 ft. Wm. A. Stone-W. L. Pierson et al's Mrs. J. I. Perkins (200-ac) 1, Thos. Stanford sur, elev 268 ft, dry and abn 3123 ft. Wilson-Stubbs Oil Corp.'s M. F. Ragsdale (53-ac) 1, J. P. Wolfin sur, sd 3600 ft.

DELTA COUNTY—C. M. Joiner Pet. Corp. et al's J. A. Blackwell 1, H. Dunnetella sur, Woodbine sand 1935-1950 ft, top Georgetown lime 2030 ft, top Comanchean 2913 ft, sd 3220 ft. J. O. Wheeler-Neuville & Yarbro's Ablovich 1, E. Chick sur, elev 507 ft, Austin chalk 1885-1895 ft, sd 3815 ft.

ELLIS COUNTY—Armstrong Bros. et al's Cook 1, S. Frederick sur, sd 460 ft. Carl Brooks et al's Anderson 1, E. C. Branch sur, base Austin chalk 179 ft, top Woodbine 550 ft, top Del Rio 735 ft, top Georgetown 900 ft, sd 1050 ft. Paris Oil Co.'s O. S. Bain (60-ac) 1, R. M. Williamson sur, Austin chalk 480-647 ft, sd in shale 925 ft.

FRANKLIN COUNTY—Franco Oil Co. (J. F. Mills-L. S. Harper-A. P. McGee et al's) L. S. Harper (118-ac) 1, W. H. Dawson sur, elev

356 ft, top Pecan chalk 1320 ft, tested salt water in Woodbine 3404 ft, sd to set 5 3/16-in cas to re-test.

FREESTONE COUNTY — Clyde Creighton & Co.'s W. A. Holley (80-ac) 1, A. B. & M. sur, abst 51, sd 1865 ft.

HENDERSON COUNTY—B. L. Green et al (was J. M. Roger's) M. H. Gossett (103-ac) 1, L. D. Stover sur, abst 87, elev 341 ft, top Taylor 1450 ft, top Austin chalk 2347 ft, sd for cas 3147 ft. Dr. J. F. Kennon (Sunny South Oil Co.'s) Rowe-Baker 1, J. T. Childress sur, sd 920 ft. Clint W. Murchison-D. S. Golding et al's S. G. Benton (77-ac) 1, E. G. Reynolds sur, elev 449 ft, Pecan chalk 2749-3085 ft, Austin chalk 3605-3950 ft, top Woodbine series 4404 ft, top red beds 4480 ft, fsh 4480 ft. H. H. Myers et al's M. E. Olson (80-ac) 1, Geo. Wilson sur, elev 512 ft, top Pecan chalk 3070 ft, dr shle 3245 ft.

HILL COUNTY—T. J. Spikes et al's M. H. Davis (55-ac) 1, J. R. Alexander sur, Austin chalk 727-1030 ft, sd 1319 ft.

HOPKINS COUNTY—Columbia O&G Co.-K. L. McHenry's W. J. McLeod (85-ac) 1, (ast) D. Holbrook sur, sp. Burgess & Simpson's 1st. Nat'l Bank of Mt. Vernon 1, M. E. & P. Ry. sur, dk. Harmony Oil Co., (J. F. Roark's) J. L. Taylor (88-ac) 1, John Polk sur, sd 540 ft.

HUNT COUNTY — W. B. Chandler-B. P. Williamson & Wm. C. McGlothlin's Mrs. A. Walker (2½-ac) 1, J. B. Bowerman sur, elev 541 ft, top Nacatoch 990 ft, Austin chalk 1790-2190 ft, top Woodbine sand 2853 ft, top red beds 2996 ft, sd 3163 ft.

KAUFMAN COUNTY—Geo. H. Anderson-Maurice Grubb et al's W. W. Moody (308-ac) 1, H. G. Hider sur, Austin chalk 2377-2580 ft, dr 2950 ft. Stanley Darrill-Witherspoon et al's S. Pannill (649-ac) 1, A. Cherino sur, claim saturated Woodbine sand 2481-2485 ft.

LEON COUNTY — Leon Co. Oil Co., (Claude Kavanaugh's) John Morris (200-ac) 1, A. F. McWhorter sur, sd 2540 ft. Penn Oil Co.-Black & Shell Pet. Corp.'s Wm. Phillips (160-ac) 1, E. A. Swayze sur, elev 423 ft, top Pecan chalk 4135 ft, dr sandy shale 4215 ft. John P. Sheffler & Allday's W. R. Thompson (197-ac) 1, N. M. Allen sur, sd 1000 ft.

LIMESTONE COUNTY—C. M. Joiner Pet. Corp. & Miller Drl. Co.'s W. Stephenson (54-ac) 1, Geo. Gentry sur, sd 2760 ft.

MORRIS COUNTY — Buchanan-Burkhalter et al's Staggers (65-ac) 1, Forbes & Nelson sur, elev 370 ft, hard Pecan chalk 2526-3020 ft, Austin chalk 3483-3506 ft, sd in hard sand 3591 ft. C. M. Joiner Pet. Corp.-Harris Drl. Co.'s C. D. Brown 1, Wm. M. Coffey sur, dk.

RAINS COUNTY — Fred F. Harris-Claude Dally-Geo. Greer & Eckholm's M. A. Markowitz (106-ac) 1, Chas. Despaler sur, sp.

RUSK COUNTY—T. E. Castle et al's R. H. Gary (50-ac) 1, J. Latham sur, top Pecan chalk 2678 ft, top Austin chalk 3480 ft, top Georgetown 3672 ft, sd 3759 ft. G. A. Hathaway et al (was Laster & Miller's) Gray 1, Jas. McClain sur, elev 315 ft, Pecan chalk 2180-2537 ft, top Austin 2980 ft, sd in shale 4015 ft. John Keegans et al's R. L. Needham 1, J. H. Chambers sur, sd for cas 1414 ft. R. H. Lemmon & A. F. Richardson's Luke Motley-H. Wood (498-ac) 1, J. I. Sanches sur, lcn. Fred W. Shields et al's R. L. Buckner (320-ac) 1, John E. Davis sur, lcn. Wells & Lassiter (was Graddy Vaughn et al's L. T. Barton 1, sd in Georgetown 3430 ft.

SMITH COUNTY—McRobie et al's C. P. Hamilton (259½-ac) 1, J. Rector sur, dk. Mundt & Mount et al's Murray (65-ac) 1, Marshall University sur, Navarro 2858-79 ft, dr chalk 2915 ft.

UPSHUR COUNTY—J. P. Evans et al's W. E. Bell (63-ac) 1, Wm. McFadden sur, rig. Scott & Ashland's H. Doughfrate (128-ac) 1, M. P. del Torres sur, Pecan chalk 2600-3024 ft, top Blossom 3385 ft, sd 3660 ft. J. K. Wadley-J. P. Evans & C. Lyons' W. S. Jones 1, Jas. Dunn sur, cem 10-in cas 40 ft. B. L. Watson et al's D. K. Smith 1, J. R. Davis sur, sd 1865 ft.

VAN ZANDT COUNTY—Daisy O&G Co.'s Mrs. C. A. Browning (100-ac) 1, J. P. Tackett-Bell sur, Pecan chalk 2109-2230 ft, top Austin chalk 3160 ft, sd 3287 ft. B. E. Gamble et al's I. D. Walker (1-ac) 1, J. Walling sur, dk. J. Alvin Gardner & Roy C. Ling's J. Leonard (53½-ac) 1, Philip Mason sur, Pecan chalk 2340-2410 ft, top Austin chalk 3475 ft, dr shale 4005 ft. A. C. Roan et al's W. E. Price (7-ac) 1, J. Walling sur, Pecan chalk 1680-1895 ft, Austin chalk 2595-2770 ft, dr shale 2865 ft.

WOOD COUNTY — DeGenther & F. H. Zeigen et al's M. L. McClain (66-ac) 1, Sam Brooks sur, elev 455 ft, Pecan chalk 2553-2740 ft, coring 3855 ft. Hudson-Shelton & Talko Pet. Corp.'s C. S. Ross (86-ac) 1, F. L. Smith sur, elev 359 ft, top Pecan chalk 2892 ft, sd 3840 ft and may skid rig. W. B. Saulsbury et al's T. H. Peterson (320-ac) 1, W. B. McNutt sur, abst 418, cem cas 110 ft. Wood County O&G Co.'s Guy Davis 1, John R. Clute sur, dr chalk 2710 ft.

Texas Permits

ARCHER COUNTY—Underwood Drilling Co., Wichita Falls, H. L. Ward, A, 70, 8, 1382 TE&L sur, 666 ft from n and 750 ft from e line. Cable Oil Co., Wichita Falls, J. S. Matlock, 40, 1, B 25, J. Saunders sur, se corner. A. Z. Kouri, Wichita Falls, Montgomery, 50, 3, B 133, Club Ranch sur. 300 ft se of No. 1. Schulz & Weaver, Wichita Falls, F. C. Green, 160, 10, J. Levins sur, 1800 ft from w and 1700 ft from s line. Huggins Oil Co., Wichita Falls, J. R. Parkey, 80, 2, S 2, S. P. Ry. sur, 1050 ft from n and e lines. White, Duncan, Holt & Tedford, Wichita Falls, J. L. Webb, 49, 1, B 11, I&GN sur, nw corner; S. Webb 40, 11, Blk. 1, I&GN sur, 150 ft from w and 450 ft from n line. Krahenbuel & King, Archer City, W. L. King, 20, 1, Wm. Henry sur, 150 ft from n and e lines. Pois & Schulz, Wichita Falls, W. O. Davis, 41, 1, Blk 5, C&P sur, 330 ft from s and w lines.

ATASCOSA COUNTY — T. W. Callahan, San Antonio, W. A. Blackwell, 174, 1, J. Houlihan sur, 130 ft from s and 975 ft from e li Blk. 49.

BASTROP COUNTY—J. E. Emanuel, San Antonio, H. Klemm, 100, 1, R. S. Teal sur, 817 ft from w and 300 ft from s line.

BEE COUNTY—Howeth & O'Neil, Beeville, H. M. King Est., 104, 1, R. Stevenson sur, 660 ft from s and w lines. Gulf Coast Oil Co., San Antonio, R. A. McKinney, 858, 5, R. C. Ballard sur, 500 ft ne of No. 4.

BEXAR COUNTY—W. R. Swearingen, San Antonio, J. E. Halbardier, 93, 12, No. 57 J. M. F. Perez sur, 902 ft from n and 150 ft from e line.

BRAZORIA COUNTY—Medlin & Parsons, Houston, P. S. Griffith, 317, 1, A. L. Lewis sur, 400 ft from nw and 3421 ft from sw line.

CALLAHAN COUNTY—J. A. Miller, Cross Plains, F. Cuthbirth, 120, 1, Edwards sur, 600 ft e of center of w line. Geo. A. Perry, Baird, E. H. Williams, 160, 1, S 26, D&D Asy. sur, 1200 ft from n and 1000 ft from e li ne¼.

CHAMBERS COUNTY—Texas Gulf Prod. Co., Houston, Ilfrey, 4, H. Griffith sur, 894 ft from e and 41 ft from s line. Mills Bennett Prod. Co., Houston, Kirby, 15, 5, H. Griffith sur, 400 ft from w and 41 ft from s line, Amended location. Humble Oil & Ref. Co., Houston, Kirby, B, 49, 1, H. Griffith sur, 208 ft from s and 100 ft from e line.

CLAY COUNTY—Kirkley & Wright, Petrolia, Byers, 111, 1, Bl. 8, Byers sur.

COOKE COUNTY—D. L. Monroe, Gainesville, J. W. Wilburn, 40, 1, J. DeGuire sur, 150 ft from w and 850 ft from s line. W. D. Cline, Wichita Falls, C. G. Clayton, 137, 3, E. Reed sur, 400 ft sw of No. 2.

COLEMAN COUNTY—McDonald & Campbell, Dallas, A. Bennett, 100, 3, No. 480 L. Johnson sur, 200 ft from s and e li Blk. 12. Blakely & Engel, Santa Anna, J. L. Stewardson, 80, 2, S 91, E. T. Ry. sur, se corner.

DUVAL COUNTY—Texas Co., Houston, M. B. Johnson, 120, 1, W. N. Seago sur, 330 ft from s and e lines. Humble Oil & Refg. Co., Houston, P. E. White, 640, 7, Sec. 58 sur, 1380 ft from w and 2630 ft from s li sec. Southwest Drilling Co., San Antonio, R. Wendt, 160, 4, Sec. 43 sur, 330 ft from n and e li se¼ se¼. Thomas & Tarver, San Antonio, Duval Ranch, 40, 2, Sec. 576 sur, 350 ft from n and e lines. San Diego Oil Corp., San Antonio, L. Bennett, 40, 2, Sec. 44 sur, 330 ft from s and w li ne¼ sw¼.

FORT BEND COUNTY—Gulf Prod. Co., Houston, E. I. Booth, A, 1107, 6, S. Kennedy sur, 4244 ft from w and 467 ft from s line.

FRANKLIN COUNTY — F. Prince et al, Corsicana, M. Ferguson, 40, 1, Z. Rogers sur, 150 ft from s and w lines of survey.

GREGG COUNTY—Russell Pet. Corp., Kilgore, M. T. Cole, 187, 2, J. A. Duncan sur, 330 ft from e and 990 ft from s line. J. H. Massie et al, Gladewater, M. Fenn, 28, 6, H. Edwards sur, 150 ft w of center of e line. D. D. D. Oil Co., Eastland, Adkins Hrs., 2, D. Dainwood sur, 293 ft e of center of w line. Columbia Oil & Gas Co., Dallas, T. Snoddy, 13, 3, W. H. Castleberry sur, 150 ft from n and e lines. J. F. Lucey, Dallas, J. A. Knowles, 5, 2, Kilgore sur, 96 ft from ne and 123 ft from se line. Navarro Oil Co., Houston, E. G. Green, 23, 4, M. Van Winkle sur, 766 ft sw of No. 1. Rajo Oil Corp., Fort Worth, A. C. McComic, 118, 5, Taylor sur, 600 ft sw of No. 4; 6, 600 ft sw of No. 5; J. E. Mabee Co., Arp, H. F. Whitehurst, 60, 2, McKinney-Williams sur, 370 ft from e and 241 ft from s line. J. D. Blanton, Shreveport, La., M. E. Anderson, 1, 1, M. Van Winkle sur, center. F. H. E. Oil Co., Fort Worth, R. Christian, 61, 5, G. W. Hooper sur, 383 ft from e and 873 ft from s line. Simms Oil Co., Dallas, J. J. Flewellen, 200, 8, M. Mann sur, 990 ft w of No. 4. Barnsdall Oil Co., Tulsa, Okla., S. Ferguson, 36, 6, H. Hokit sur, 227 ft from n and 185 ft from w line, amended location. D. D. Rogers, Dallas, J. M. Christian, 2½, 1, G. W. Hooper sur, 183 ft from w and 157 ft from s line. Octagon Oil Co., Tulsa, Okla., J. M. Blackman, 107, 4, W. P. Chisum sur, 660 ft s of No. 1. J. E. Mabee Co., Arp, M. T. Cole, 120, 4, T. Johnson sur, 660 ft e of No. 2. J. M. Lapin, Kilgore, Fee, 1, 1, M. Van Winkle sur, 227 ft from w and 52 ft from n line. Blue Star Oil Co., Fort Worth, Tract 6, C, Sabine River sur, 345 ft n of Gulf-Strong No. 2; E, 950 ft sw of Gulf-Judge No. 18; F, 770 ft w of Gulf-Judge No. 23; G, 990 ft sw of Gulf-Judge No. 20; J, 750 ft w of Gulf-Judge No. 13; K, 640 ft e of Invincible-Elder No. 4; L, 600 ft se of No. K; Tract 7, D, 150 ft w of Shell-Jobe No. 3; B, 480 ft nw of Gulf-Brown No. 3; E, 620 ft w of Sinc-Prai, King No. 26; F, 670 ft nw Sinc-Prai. King No. 26. J. F. Lucey, Rec., Dallas, J. M. England, 32, 4, M. Van Winkle sur, 210 ft from e and 181 ft from s line. Selby Oil & Gas Co., Tulsa, Okla., Snavely, B, 362, 14, F. W. Johnson sur, 330 ft from e and 65 ft from s line. Amerada Pet. Corp., Fort Worth, A. Tooke, 60, 6, W. G. Painter sur, 990 ft from n and 350 ft from e line. New Process Prod. Co., Dallas, Geo. Anderson, 8, 3, P. McAnally sur, 1438 ft e of center of w line; 4, 778 ft e of No. 3. R. E. Hubbard, Dallas, N. J. Tuttle, 1½, 1, J. R. Castleberry sur, center. Jones-O'Brien, Inc., Shreveport, La., Hughey-Ross, 127, 8, Jno. Moffitt sur, 211 ft from w and 330 ft from s line. Shano Oil Co., Longview, S. G. Smith, 18, 3, 160 ft from n and 330 ft from w line. W. E. Barker, Gladewater, G. W. Richey, 3, 1, Wm. Carlton sur, center. J. E. Mabee Co., Arp, M. T. Cole, 120, 3, T. Johnson sur, 150 ft from n and 569 ft from w line. R. Y. Walker, Dallas, A. H. Tubbs, 51, 6, D. Sanchez sur, 150 ft from w and 770 ft from s line. Atlantic Oil Prod. Co., Dallas, J. C. Judge, B, 65, 32, Johnson sur, 960 ft from w and 330 ft from s line; 33, 1550 ft from w and 80 ft from s line; 34, 330 ft from s and 660 ft from e line; J. M. Moore, 456, 29, Johnson sur, 600 ft from e and 330 ft from s line; M. Hays, B, 404, 32, W. C. Alvice sur, 1145 ft from w and 330 ft from s line; H. Pritchard, 100, 9, F. W. Johnson sur, 330 ft from s and e lines. Stanolind Oil & Gas Co., Fort Worth, P. McGeorge, 100, 6, P. McAnally sur, 1185 ft from n and 975 ft from e line. Humble Oil & Refg. Co., Houston, A. L. Hughes, 92, 8, G. H. Hampton sur, 330 ft from s and w lines; D. Thomas, 59, 10, M. Van Winkle sur, 205 ft from n and 2100 ft from e line; S. S. Laird, B, 568, 18, M. Van Winkle sur, 1206 ft from w and 425 ft from se line; T. M. Armstrong, 155, 8, J. R. Crosby sur, 970 ft from e and 990 ft from s line. Magnolia

Pet. Co., Dallas, O. F. Smith, 92, 6, H. H. Edwards sur, 660 ft e of No. 5; G. W. Tate, 66, 4, J. Ruddle sur, 330 ft from n and e lines; H. B. Zeigler, 120, 8, P. McAnally sur, 310 ft sw of No. 7. Tidal Oil Co., Kilgore, C. C. Clemons, 28, 5, D. Sanchez sur, 200 ft from n and 502 ft from e line; J. J. Castleberry, 15, D. Sanchez sur, 1560 ft from w and 330 ft from s line; J. S. Elder, 80, 2, M. Van Winkle sur, 330 ft from nw and 284 ft from s line. Shell Pet. Corp., Dallas, B. F. Laird, A, 211, 8, J. Wilkinson sur, 660 ft n of No. 2; M. J. Register, 50, 4, D. Sanchez sur, 330 ft from s and 300 ft from e line; S. C. Fishburn, 100, 7, F. W. Johnson sur, 330 ft from s and e lines; O. Lockett, 25, 3, D. Ferguson sur, 330 ft from n and 290 ft from w line. Gulf Prod. Co., Houston, M. O. Shepperd, 335, 21, G. R. Rains sur, 660 ft nw of No. 19. Sun Oil Co., Dallas, J. M. Haynes, 201, 14, G. A. Thomason sur, 330 ft from n and e lines; J. C. Gray, 114, 10, D. Sanchez sur, 330 ft from s and w lines. Yount-Leet Oil Co., Beaumont, L. E. Orms, 56, 6, W. H. Castleberry sur, 330 ft w of center of e line.

GALVESTON COUNTY — Yount-Lee Oil Co., Beaumont, E. K. Cade, 460, 32, N. Fitzsimmons sur, 600 ft s of No. 30.

GOLIAD COUNTY—T. B. Slick Est., Oklahoma City, Okla., J. R. Kaufman, 160, 2, Tr. 13, Trevino sur No. 45, 330 ft from w and 660 ft from s line.

HARDIN COUNTY — Houston Oil Co., Houston, Arriola, Y1, E. Arriola sur, 5610 ft from n and w lines or survey.

JASPER COUNTY—Gulf. Prod. Co., Houston, Miller-Vidor, 4014, 1, S. Gray sur, 2893 ft from n and 112 ft from w line. Houston Oil Co., Houston, B. Ricardson, 4428, 1, B. Richardson sur, 2000 ft from n and 3000 ft from e line.

JACK COUNTY — Pete Shabay, Jacksboro, Fee, 4, 1, I. Hughson sur, 60 ft from n and 996 ft from e line. Harper Trust Co., Bryson, O. Bennett, 40, 1, S. H. Evans sur, 330 ft from n and e lines.

LIBERTY COUNTY—Ferguson-Head, Houston, Quintette, 10, 1, No. 125 H&TC sur, 40 ft from w and 655 ft from s line.

LIVE OAK COUNTY—Brown & Whitting, San Antonio, A. Laster, 175, 1, S. Hays sur, 900 ft from s and 1200 ft from w line.

MONTGOMERY COUNTY—Humble Oil & Refg. Co., Houston, So. Tex. Dev., 5, T. Slade sur, 330 ft s of center of n line; 9, 330 ft e of center of w line; 6, 3785 ft from w and 335 ft from s line; R. L. Cartwright, 20, 1, J. A. Davis sur, 470 ft from n and 300 ft from w line; R. L. Cartwright, 5, J. A. Davis sur, 2239 ft from e and 370 ft from s line; So. Tex. Dev., 15, T. Slade sur, 709 ft n of No. 10. Showers & Moncrief, Inc., Longview, Dunn Est., 30, 1, J. M. Real sur, 342 ft from n and 637 ft from w line. Midland Oil Co., San Antonio, V. Wolters, 108, 1, W. L. Strickland sur, 466 ft from n and e lines. Alpha Pet. Corp., San Antonio, R. R. Dunn, 20, 1, M. W. Real sur, center. Humble Oil & Refg. Co., Houston, So. Tex. Dev., 7, T. Slade sur, 330 ft n of center of s line; 8, 330 ft e of center of w line. W. B. Hamilton, Wichita Falls, E. Morehead, 40, 1, L. A. Lang sur, 360 ft from s and e lines.

McMULLEN COUNTY—Skinner & Bailey, Houston, F. H. Burmeister, 640, 1, Blk. 1, GH&H sur, sw cor of Sec. 14.

NUECES COUNTY—Gulf Port Oil Corp., San Antonio, J. M. Luby, 3900, 1, B 1, S 2, A. Collins sur, 2044 ft from e and 2142 ft from s line.

PALO PINTO COUNTY—Brazos River Gas Co., Mineral Wells, W. C. Bridges, 204, 3, R. Clark sur, 1800 ft from w and 425 ft from n line. P P Oil & Gas Corp., Strawn, T&P Ry, 1¾, 1, Blk. 36, Strawn sur, 10 ft from n and w lines of lot 10.

PECOS COUNTY—Kone Prod. Co., San Antonio, Pecos Valley, 320, 1, S 34, B 3, H&TC sur, 330 ft from nw and 1650 ft from sw line.

POLK COUNTY—Dick Schwab, Houston, Davis-Holmes, 160, 1, No. 7 A. viesca sur, 660 ft from s and w line.

RUSK COUNTY—Unacre Oil Co. & Bryant, San Angelo, E. S. Thrash, 1, B1, Blk. 3, F. Cordova sur, 57 ft from n and 75 ft from w line. Haynes Drlg. Co., Shreveport, La., J. T. Brown, 40, 6, M. P. Pru sur, 551 ft from n and 163 ft from w line. B. L. Snyder, Dallas, J. H. Stewart, 5, 2, Tutt & Womack sur, 330 ft from s and e lines—amended lcn. R. H. Dearing & Sons, Dallas, L. L. Jones, 20, 3, F. Cordova sur, 400 ft from w and 180 ft from s line. M. J. Munn, Longview, I&GN, 33, 2, Wm. Killen sur, north central part of lease; 5, 900 ft n of No. 6; 6, 1700 ft n of south corner. American Liberty Oil Co., Dallas, I. L. Kinney, 336, 13, M. V. Pena sur, 330 ft from n and 844 ft from e line; 14, 819 ft from n and 333 ft from e line; L. J. Pinkston, A, 87, 5, M. J. Pru sur, 210 ft from w and 330 ft from s line; 6, 710 ft from n and 205 ft from w line. Goodnight-Donald Oil Corp., Dallas, L. Tolliver, 11, 4, J. Ximinez sur, 150 ft from n and e lines. Gant & Garvin, Ardmore, Okla., Moore Est., 70, 2, M. V. Pena sur, 330 ft from s and w lines. R. J. McMurrey, Tr., Henderson, A. D. Blackwell, 9, 1, M. J. Pru sur, 251 ft from n and 244 ft from e line. Baldwin-Sultan Oil Co., Walters, Okla., M. L. Thompson, 10, 2, M. J. Pru sur, 221 ft from e and 330 ft from s line. C. C. Wood, Tyler, J. H. Scoggins 30, 1, E. Collard sur, 330 ft from n and w lines; 2, 660 ft s of No. 1. Trico Oil Co., Dallas, D. Bradford, 10, 1, J. Ximinez sur, 330 ft from n and 225 ft from w line. Jno. F. Merrick, Fort Worth, Geo. Thompson, 10, 3, Hobson-Wynn-Y'Barbo sur, 548 ft from n and 216 ft from w line. Great Eastern Oil Co., Dallas, J. R. Alford, 5, 1, T. J. Moore sur, center of Blk. 32. Arrow Refg. Co., Fort Worth, E. M. Thrash, 3½, 3, Cordova sur, 120 ft n of center of s line. American Liberty Oil Co., Dallas, J. E. Thrash, 20, 3, F. Cordova sur, 33 ft from n and 85 ft from w line. Lucey Pet. Corp., Longview, B. F. Maxwell, 21, 3, R. H. Penney sur, 280 ft from e and 330 ft from s line. Dave Donoghue, Fort Worth, M. Johnson, 18, 2, J. Lee sur, 330 ft from w and 140 ft from s line. Mid-Kansas Oil & Gas Co., Shreveport, La., P. Tipps, 22, 3, P. Tipps sur, 330 ft from s and e lines; S. H. Moores, 194, 11, M. J. Pru sur, 196 ft from e and 475 ft from s line. Stanolind Oil & Gas Co., Fort Worth, R. A. Moores, 47, 18, J. B. Cadena sur, 655 ft from n and 92 ft from e line. Sinclair-Prairie Oil Co., Fort Worth, P. S. Tipps, A, 123, 10, B. F. Poindexter sur, 970 ft from n and 2445 ft from e line. Humble Oil & Refg. Co., Houston, A. D. Blackwell, A, 242, 10, F. Cordova sur, 1200 ft from n and 1250 ft from w line; L. D. Crim, 907, 25, E. G. Sevier sur, 660 ft nw of No. 40; J. Thompson, 82, 5, J. Smith sur, 946 ft from n and 975 ft from e line; J. Wooley, 100, 5, M. McCabe sur, 330 ft from n and 755 ft from e line; V. Turner, A, 123, 6, T. J. Martin sur, 780 ft from n and 1570 ft from e line; C. Pilgreen, 136, 8, J. M. Barton sur, 1285 ft from n and 701 ft from e line; J. Thompson, 82, 5, J. Smith, 946 ft from n and 974 ft from e line; F. F. Wooster, 61, 4, F. Cordova sur, 447 ft from n and 425 ft from w line; H. Sexton, C, 84, 5, M. McCabe sur, 330 ft from e and 990 ft from s line; H. A. Piercy, A, 116, 6, T. J. Martin sur, 800 ft from n and 1700 ft from e line; H. Sexton, B, 264, 10, McCabe sur, 660 ft e of No. 1; R. T. Cameron, 50, 3, T. J. Martin sur, 330 ft from s and 668 ft from e line; R. H. Laird, 63, 5, W. P. Chisum sur, 330 ft from nw and 81 ft from w line; S. A. Plowman, A, 228, 14, F. Cordova sur, 1093 ft from n and 250 ft from e line. Hunt Prod. Co., Tyler, D. M. Bradford, D, 226, 3, J. Ximinez sur, 340 ft from w and 780 ft from s line; R. W. Fair, C, 211, 10, M. J. Pru sur, 1477 ft from n and 1139 ft from w line. Sun Oil Co., Dallas, A. Lee, 147, 3, P. Tipps sur, 660 ft nw of No. 2.

REAGAN COUNTY — Big Lake Oil Co., Texon, University, 640, 181, Sec. 10, Blk. 2, 2000 ft from w and 1700 ft from s line of sec.

REFUGIO COUNTY—Humble Oil & Refg. Co., Houston, M. V. O'Connor, 3, F. Rios sur, 13,575 ft from s and 3412 ft from e line.

SMITH COUNTY—Pugh-Hickman Drlg. Co., Shreveport, La., S. S. Cook, 28, 4, Jas. Jordan sur, 150 ft from w and 250 ft from s line. Arcadia Refg. Co., Tyler, J. R. Green, A, 55, 7, Jas. Jordan sur, 330 ft from n and 308 ft from e line. E. J. Mountz, Clearfield County, Penna., T. O. Wright, 1, 1, J. Vargas sur, 104 ft from s and w lines. C. L. Mahaney, Dallas, J. P. Lanham, 7½, 1, J. Vargas sur, 210 ft from n and e lines. Sinclair-Prairie Oil Co., Fort Worth, A. S. Jarvis, C, 256, 16, M. S. Coy sur, 330 ft from n and e lines of survey. Sun Oil Co., Dallas, M. Burns, 109, 1, J. Vargas sur, 330 ft from s and e lines. Texas Co., Shreveport, La., A. S. Jarvis, 155, B6, M. S. Coy sur, 330 ft from w and 2310 ft from n line; A. S. Jarvis, 161, 9, I. Moore sur, 330 ft from n and 1301 ft from e line. Mid-Kansas Oil & Gas Co., Shreveport, La., M. L. Thompson, 95, 9, I. Moore sur, 330 ft from n and 710 ft from w line.

SHACKLEFORD COUNTY—Roeser & Pendleton, Inc., Fort Worth, W. I. Cook, 600, A1, S 112, E.T. Ry. sur, 2070 ft from n and 2080 ft from e line of sec. Gilman & McMurray, Cisco, E. A. Jeter, 350, 5, S 15, B 11, T&P sur, 182 ft from e and 155 ft from s line.

STARR COUNTY—B & B Oil Co., McAllen, Kelsey-Bass, 1024, 1, Por. 87, Camargo sur, 712 ft from w and 441 ft from s line. L. G. Mundy, Rio Grande City, M. R. G. Salinas, 40, 1, Sh. 38c, B 12, Por. 80, 190 ft from s and 155 ft from w line. Tarver & Nance, Inc., San Antonio, Kelsey-Bass, 40, 6, Sec. 76, Blk. 7, 450 ft from n and 300 ft from w line. Allison & Doyle, Rio Grande City, C. Salinas, 30, 1, Sh. 15B, Por. 80, 150 ft from n and e lines of lot 2. W. P. Chancellor, Mission, A. Guerra, 1, No. 6 San Jose sur, 2600 ft from w and 26,000 ft from s line of survey.

UPSHUR COUNTY—R. H. Vise, Dallas, L. Graves, 20, 1, M. Irwin sur, 330 ft from s and w lines; 2, 660 ft n of No. 1. Arcadia Refg. Co., Tyler, A. O. Phillips, 23, 4, S. Harrell sur, 375 ft n of No. 3. Conservative Oil Co., Dallas, E. O'Byrne, 20, 2, D. Ferguson sur, 330 ft from e and 101 ft from s line. Peckham Oil Co., Wichita Falls, E. H. Hamilton, 150, 2, Wm. King sur, 660 ft w of No. 1. Reliance Oil Corp., San Antonio, L. P. League, 24, 1, H. F. Rogers sur, 136 ft from n and 330 ft from e line. Humble Oil & Refg. Co., Houston, I. D. Smith, 246, 14, E. A. J. Evans sur, 330 ft from n and w lines; A. J. Watkins, 76, 5, E. A. J. Evans sur, 330 ft from s and w lines; E. Edwards, 73, 5, D. Ferguson sur, 1250 ft from w and 550 ft from s line; I. D. Smith, 246, 13, H. H. Edwards sur, 330 ft from e and 345 ft from s line; W. W. Holland, 201, 12, T. Allen sur, 907 ft from n and 600 ft from w line. Stanolind Oil & Gas Co., Fort Worth, J. J. Flewellen, C, 200, 10, M. Mann sur, 4290 ft from w and 410 ft from s line. Texas Co., Shreveport, La., J. Williams, 93, 2, J. Crouch sur, 330 ft from s and e lines. Sun Oil Co., Dallas, J. Hargraves, 200, 9, M. Mann sur, 1356 ft from w and 1240 ft from s line. California Pet. Corp., Shreveport, La., I. Walker, 120, 10, S. Harrell sur, 330 ft from n and e lines.

VAN ZANDT COUNTY—Pure Oil Co., Fort Worth, W. Enas, 30, 2, J. Prado sur, 225 ft from w and 150 ft from s line; J. T. Taylor, 44, 3, J. Walling sur, 320 ft from w and 250 ft from s line; G. C. Stewart, 50, 4, A. McPhail sur, 225 ft from s and w lines; R. A. Tunnell, 100, 7, J. Walling sur, 787 ft from n and 200 ft from e line; A. D. Clark, 17, 2, A. H. Wiley sur, 225 ft from n and 218 ft from w line; A. D. Clark, 42, 3, A. H. Wiley sur, 225 ft from n and 218 ft from e line; D. R. Howell, 60, 5, H. V. Moore sur, 250 ft from s and w lines.

WICHITA COUNTY—C. W. Clark, Wichita Falls, Kemp-Blair, 40, 3B, B 44, R. J. Scott sur, 900 ft from n and 450 ft from w line. F. C. Baldwin et al, Wichita Falls, G. L. Dobie, 55, 7, DL&C sur, 670 ft from n and 605 ft from w line. J. L. Swanner, Wichita Falls, Williams-Parker, 160, 7, B 15, P.P.C.S.L. sur, 1250 ft from n and 450 ft from w line.

WARD COUNTY — Gulf Prod. Co., Fort Worth, Hutchings, 370, 13, S 5, B F, GM MB&A sur, 790 ft s of No. 10.

WALLER COUNTY — Bunte & Hobson, Tyler, G. W. Harris, 1425, 1, J. Liendo sur, 3000 ft from e and 5000 ft from s line.

WHARTON COUNTY — Shell Pet. Corp., Dallas, W. H. Mitchell, 640, 1, Sec. 8, G. C. Gifford sur, 1320 ft from n and w lines of sec.

YOUNG COUNTY — H-Y Oil Co., Fort Worth, B. P. Larimore, 40, 6, 2247, TE&L sur, 150 ft from n and w lines. H. J. Whitaker, Olney, T. F. Harrison, 40, 2, L. Sallee sur, 300 ft sw of No. 1. E. R. Riggs, Graham, G. McClure, 502, 1, 1949 TE&L sur, 750 ft from w and 800 ft from n line s½. Degener & Murrell, Graham, E. Johnston, 48, 1, A. McLennan sur, 1490 ft from n and 264 ft from w line. E. R. Perkins, Olney, H. N. Tucker, 40, 1, 180 TE&L sur, 150 ft from s and e lines. Wooten & Reed, Graham, A. E. Robinson, 57, 1C, 1467 TE&L sur, 1512 ft from w and 750 ft from n line.

ZAPATA COUNTY — Texas Co., Houston, Jennings, 13, C. Blanco sur, 450 ft n of No. 12.

NORTH and WEST TEXAS

Drill More Deep Wells at Big Lake to Equalize Water Intrusion. Llano Pool Well Flows 50 Barrels Hour.

H. H. KING, *Staff Representative, Fort Worth, Texas*

Ector County Wildcat Promises New Oil Field

San Angelo, Texas.—Appearance of oil in Broderick & Calvert's wildcat test on the J. E. Parker ranch in Ector County promises to yield a new field for the West Texas district and the third one in the above county. Parker 1, NWc Section 15, Block 44, T. & P. Ry. Survey, T-2-S, and about seven miles northeast of the Judkins-Connell field, developed free oil in the hole from lime formation at 4192-4200 feet. Drilling was in progress below 4210 feet late last week with the formation showing better porosity. This wildcat has a surface elevation of 3114 feet, and logged the top of the big lime at 3800 feet. It is near the center of a 3900-acre block held under lease by the above Fort Worth operators and their associates.

The Llano pool in northern Winkler County furnished its largest producer when Sid Richardson et al's W. F. Scarborough 1, located in the south portion of the ranch, flowed 54 barrels of 34.4° gravity oil per hour for two hours on September 24, from sandy-lime at 2841-75 feet, with the best pay in the last five feet of hole drilled. The well was shut in for storage, and bridged when opened several days later. Removal of the bridge restored the flow to 20 barrels hourly while flowing against 750 pounds back pressure. This record well for the pool is located 1650 feet from the north and west lines of Section 1, Block 77, P. S. L. Survey, and is an east offset to Magnolia Petroleum Company's Scarborough 3, which is flowing 60 barrels, or 50 per cent of its initial although completed in November, 1930. The new producer has a surface elevation of 2908 feet, and is three feet deeper than the offset. Gulf Production Company has a one-sixteenth over-riding royalty under Richardson's well, which has been given connection by The Texas Pipe Line Company.

Ordovician Lime Tests Get Water Instead of Oil

San Angelo, Texas.—Two deep tests trying for production in the Ordovician lime horizon encountered water in the expected producing horizon last week. In the Royston pool, Fisher County, Cranfill-Reynolds Company's J. C. George 1, filled up 800 feet in the three-inch cased hole with salt water from the 6202-15-foot level. Drilling has continued below 6220 feet. In Irion County, the wildcat test of M. E. Davis, Plymouth Oil Company et al on the J. D. Sugg ranch has halted operations at 8280 feet to make a bailing test of bottom hole water. The unitized wildcat block in Crocket County under going an Ordovician lime test is drilling below 5200 feet. Stanolind Oil & Gas Company is the operating company, and the test is on the J. S. Todd ranch, Section 67, Block "U-V", GC&SF Survey.

Five active test in the Big Lake field, including one in process of completion, are slated for the Ordovician lime horizon, which is productive at intervals between the 8500-9000-foot level in this field. Big Lake Oil Company's University 7-C is flowing 380 barrels of high gravity oil daily and considerable gas while drilling in with rotary below 8778 feet. This company has two additional tests to the deep horizon underway, and the Group One Oil Corporation also has a pair of tests drilling. Development of the Ordovician over a wider area is the goal of these companies in order to scatter the drainage. Heavy oil and gas withdrawals from a comparatively small area by the 10 completed deep wells has created a water problem, and it is the intention of the operators to re-condition the seven wells making water as soon as new wells are added. The 10 wells listed on the current production report are averaging about 14,200 barrels of oil daily plus 3300 barrels of salt water, or about 20 per cent water with the oil.

Objection Is Voiced to Van Method of Proration

Fort Worth, Texas.—Testimony given in protest against the distribution of production in the Van field, East Texas district, on a basis of the acre-foot thickness of the producing sand by a group of royalty owners at a hearing held here September 24 has been taken under advisement by the Texas Railroad Commission. The five companies engaged in developing the field are unanimously in accord on the sand-thickness method of prorating the field, and offered evidence to substantiate their claims that offset lease and well drainage has been more evenly balanced since the combination acreage and well potential method was abondoned October 19, 1931. The complaining royalty owners have indicated that if the commission fails to abandon the sand-thickness proration plan that an effort will be made to obtain relief through a court injunction.

Opposition to the prevailing proration plan at Van was waged by Al Broderick and Geo. Calvert, Ft. Worth royalty owners, and a number of the fee land owners residing in the field. This group favors restoration of acreage-potential proration, and submitted comparative figures to support their claim that the prevailing plan works an injustice on their royalty interests. They engaged J. S. Hudnall and Wm. C. McGlothlin, consulting geologists, as expert witnesses.

R. B. Kelly, petroleum engineer and assistant district manager for Pure Oil Company, Fort Worth, offered the principal defense testimony. E. G. Allen, Shell Petroleum Corporation; and F. E. Heath, Sun Oil Company, also gave testimony commending the fairness of the commission's present proration order in distributing the allowable, which is now limited to 45,000 barrels daily. Kelly stated that the field has produced approximately 34,000,000 barrels of oil from its 340 completed oil wells. The productive area involves 4300 acres and the total acre-foot of producing Woodbine sand underlying this area is placed at about 1,165,000 feet, according to the most recent proration schedule prepared by employes of the commission.

North and West Texas Field Developments

NORTH TEXAS

Completions

Company, Well and Location	Initial Production Bbls.	Depth
ARCHER COUNTY—		
Bobby Burns & Long, Alexander 6	5	1415
J. C. Cunningham et al, Taylor 1..	*	850
Gilliland & Rosser, Echols 1.....	15	1349
D. O. Johnson et al, Parrish 1....	*	1603
Wayne King et al, W. L. King 1..	*	1356
Texas Plains Oil Co., Terrell 11-C..	50	665
White-Duncan et al, Pruett-Webb 1-B	25	669
Wichita Prod. Co., Stewart 1.....	*	1350
WICHITA COUNTY—		
J. C. Clover et al, Overall 16.....	*	1999
C. A. Reed et al, Sisk 1.....	*	840
YOUNG COUNTY—		
Chas. Daubert et al, Weems 1, Sec. 626	*	602
E. R. Riggs et al, McClure 1, Sec. 1949	*	536
Simmons & Lively, Drum 1.....	5	485
United Producers Co., Dunagan 3, Sec. 163	25	930
Wooten & Reed, Robinson 1-C, Sec. 1467	*	703

WEST TEXAS

YATES FIELD—		
New State Oil Co., J. H. Tippett 1	95	1470
WARD COUNTY—		
Gulf Prod. Co., G. W. O'Brien 22..	90	2758

SOUTH TEXAS

Battle of Offsets Scheduled for Government Wells; Lower Sands Attract Victoria Area Operators; Tuleta Running Northeast.

EARL POST, *Staff Representative, San Antonio*

Much Activity Seen for North Government Wells

San Antonio, Texas.—A heated drilling campaign in the northern portion of the North Government Wells field, Duval County, where several extensions have been made, is evident. More than one-half dozen offset locations have been made and this number will be increased by subsequent drilling.

The Texas Company is required to drill two offsets, and will shortly have two more; Magnolia Petroleum Company, four; Seacord and associates, one. In addition, Hamill and Hamill are under contract to drill three more wells on their Hahl lease, which will bring about offsets from the Humble Oil & Refining Company, Highland Oil Company, and Magnolia. R. B. Byrd et al's campaign on the P. T. Wright lease also will bring development by the Magnolia and Humble. This new sector of the field probably will bring about the drilling of about 25 wells.

The most recent extension of the field was Highland Oil Company's A. Lundvall 1, 330 feet out of the southwest corner of the south half of the northeast quarter of Section 42. It topped the sand at 2235 feet. At 2263 feet it made an initial flow estimated at 1000 barrels. The elevation is 510 feet, giving it subsea total depth of 1753. The high sand in the well indicates that the production might extend considerably east of this new producer, giving the field a rather large producing area.

Sun Oil Company made a rather important location, being its Duval Ranch Lands 1, about four miles northeast of the north producer. The well is located 330 feet from the west line and 1650 feet from the north line of the east half of No. 78 DI & A Survey. It was rigging at last reports. It is straight in line with the present play northeast from the field and should it produce, there likely would be a flurry of activity between the well and the field.

Of particular interest was the action of three wells in the extreme northwest edge of the present producing area. Seacord and Putnam et al's Wendt 1, west offset to their Johnson 1 and most northwesterly well in the field, made an excellent producer, but was showing plenty gas. The same report came from H. H. Coffield's Wendt 3, south offset to the well. Both of the tests are in Section 43. The Magnolia's Wendt 8, east offset to the Coffield test, cored gas sand from 2286 to 2310 feet and was coring deeper. It is running very high and likely is nearing the top of the structure on the west.

New Sand May Indicate Northeast Tuleta Trend

San Antonio, Texas.—Hope for a northeastern trend to Tuleta field, Bee County, centers around O'Neill & C. R. & M. Drilling Company's J. P. Harris 1-A, 150 feet out of the northwest corner of Block 2. Harris Survey, which cored the sand at 4091-95 feet and is being given a drill stem test. It is the first well drilled to the northeast of production in the immediate area.

Farther northeast, J. S. Smith's Weiss 1, northwest corner of Block 1, J. M. Uranga Survey, was coring at 4179 feet, expecting to pick up the Pettus sand soon.

Bastrop-Caldwell County Wildcat Flows 90 Barrels

San Antonio, Texas.—R. R. Ogden's C. L. Riddle 1, wildcat several miles northeast of Dale in Bastrop County, is flowing 90 barrels daily from a break in the chalk from 2169 to 2223 feet. The well is in the Gray and Leach Survey on the Bastrop-Caldwell County line. It was put on pump and started flowing by heads at the rate of 10 to 15 barrels an hour, but settled down to the 90 barrel flow.

Several Wells Coring Lower Sand at Saxet

San Antonio, Texas.—With several wells coring the lower sands, interest centers around the Saxet field of Nueces County which has developed a number of interesting sands during the last few months.

A new producer in the 4500-foot horizon is Romanix Oil Company's Isencee 1, northwest corner of lock 12, Sheppard farm lots subdivision. At 4550 feet, this well is a large gasser spraying a small amount of oil. It is showing 1500 pounds pressure on the casing and 950 pounds on the tubing.

Gulf Port Oil Company's active campaign apparently will result in additional production. A sand was cored at 4555-60 feet in Frank Bliss 2, Section 406, and a drill stem test is being made. Dinn 1 in the same field is drilling at 3785 feet. Gulf Coast Oil Company's Perkins & LeGasse 2, Section 26, which had a lengthy fishing job, is now coring at 4883 feet.

Houston Oil Company's Harrell 2-A, Section 28, is in process of completion, being swabbed in a sand at 4400-08 feet.

Oso Drilling Company, Incorporated, was not so lucky in its N. J. Roark 3, Villareal Survey, in the above sand, testing 12 fourbles of salt water in 15 minutes from 4403-08 feet. At 4388-4400 feet, it showed considerable gas.

Three Victoria County Tests Pass 6000 Feet

San Antonio, Texas.—Victoria County's wildcats continue their operations in quest of deep production, with the 6000-foot level having been reached in three tests and still drilling.

The deepest well, Union Oil Company of Nevada's Keeran 1, M. de Leon survey, east of production, is drilling at 6637 feet and is the deepest well ever drilled in Victoria County.

The Texas Company's A. M. McFadden 3, which was deepened from its former producing horizon at 5832 feet, is down 6410 feet, while Slick-Selligson Corporation's McFadden 1, being deepend from its producing level of 4496 feet, is down 5100 feet.

Humble Oil & Refining Company's Rydolph 1, Kemper Survey, is reaming at 5935 feet, the total depth being 5990 feet. Over the line in Refugio County, the same company is preparing to spud in its O'Conner 3, J. Keating Survey, in the same general area.

Mirando District Averaged 17,836 Barrels in August

San Antonio, Texas.—A total of 1036 producing oil wells with average daily production by field of 17,836 barrels of oil and monthly runs of 552,924.88 barrels is shown by the consolidated report of production of the Mirando district for the month of August, issued by Harry L. Fansler. The 1036 wells of the district are scattered over the counties of Webb, Duval, Zapata and Jim Hogg, and brings the total oil production for the life of the district up to the end of August to 34,059,986.09 barrels.

Of the total monthly runs of 552,925.88

barrels during August, the Government Wells field of Duval County led the other 16 fields with runs of 231,920 barrels from 86 producing wells having daily runs of 7481.2 barrels under the allowable of 150 barrels per well daily. Las Escobas field of Zapata County, with 202 producing oil wells came second with monthly runs of 142,291 barrels, or 4590 barrels per day. Cole field, of Webb County, with 73 producing wells, came third with monthly runs of 43,365 barrels, or daily runs of 1398.8 barrels. Sarnosa field, of Duval County, with six producing oil wells, came fourth with monthly runs of 30,165 barrels of oil, or daily runs of 973 barrels.

Old Schott field of Webb County (one of the first of the discovery fields) with 139 producing oil wells, came fifth with monthly runs of 23,282.26 barrels, or daily runs of 751 barrels. Cuellar field of Zapata County, with 64 producing oil wells, came sixth with monthly runs of 21,058.83 barrels, or daily runs of 679.3 barrels. Old Aviator field of Webb County, with 128 producing wells, came seventh with monthly runs of 18,819.20 barrels, or daily runs of 607 barrels. The 10 other fields of the district made monthly runs ranging from 13,494 barrels from 125 wells in El Randado field of Jim Hogg County, down to 300 barrels from five wells in Alworth field of Zapata County.

Pawhuska, Okla.—Another sign of improvement in the oil industry was evident Wednesday, September 28, when Mid-Continent oil men joined in a spirited bidding which resulted in the sale of 54 of 59 Osage Indian tracts offered for sale. Of the total of 9222.80 acres offered, 8422.80 acres brought a total bonus of $101,370.00, making it one of the largest sales in several years.

South Texas Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
ATASCOSA COUNTY—		
E. A. Parkford & F. H. Etheridge, J. Dickinson 1, Lot a, sur 135..	*	1050
BASTROP COUNTY—		
R. R. Ogden, C. L. Riddle 1, Gray-Leach sur	90	2223
BEXAR COUNTY—		
Linda Oil Co., Watson 1, Ladin Sur. No. 46	*	1526
DUVAL COUNTY—		
Highland Oil Co., A. Lundvall 1, Sec. 42 1000		2263
Edwin M. Jones, J. F. Williams 1, sur 131	*	2502
S. R. & C. & Magnolia, Duval Ranch 8, Sec. 293	*	1805
KERR COUNTY—		
Eastland Oil Co., Jeff Love 1-B, Sec. 1594	*	3505
Romanix Oil Co., Isencee 1, blk 12 . .....¶30-50		4550
WEBB COUNTY—		
O. W. Killam, Hogterp 2, blk 6, sur 1110	10	1510
Hogterp 4, blk 12, sur 1110	10	1528
ZAPATA COUNTY—		
Ballard & Mercer, Flores 1, Por. 37, blk. 27	*	2505
F. M. Blair & Sons, Montemayor 1, blk 1, Share 63	*	1642

Wildcat Drilling Report

(Wells Shutdown not included)

ATASCOSA COUNTY — Tom Callahan & Fred Thrift's Riefert, 2 mi n Whitsett, dr abt 300 ft. E. A. Parkford & F. H. Etheridge's J. Dickinson 1, lot A6, Sur. No. 135, Mc-Campbell-Berry sur, dr below 1025 ft.

BANDERA COUNTY—E. A. Parkford et al's Duke 1, Sec. 7, GH&SA sur, lcn.

BASTROP COUNTY—Gant & Teas' Mikulec 1, William Barton sur, 4 mi sw Smithville, lcn, to dr to 7000 ft or 50 ft into Edwards lime. Marts & Beavens' Sloop Estate 1, J. Burleson sur, near Elgin, dr 900 ft. Properties Trading Co.'s Frietag 1, P. Conley sur, sd 2070 ft.

BEE COUNTY—Gulf Coast Oil Co.'s Hicks-Hall 5, blk. 2, Uranga sur, Normanna, ru; R. A. McKinney 5, R. C. Ballard sur, n Pettus, ru. C. F. Nichols' J. P. Harris 3, Uranga Grant, blk 10, Tuleta, dr abt 500 ft. Nichols & Bruner's Hedefels 1, John Ryan sur, 3½ mi se Beeville, dr 500 ft. O'Neill & CR&M Drlg. Co.'s J. P. Harris 1-A, No. 2 Harris sur, Tuleta, coring 4069 ft. J. A. Smith's Weiss 1, blk 1, J. M. Uranga sur, Price-Tuleta, coring 4179 ft.

BEXAR COUNTY — American Gas Co.'s Kennon 5, M. F. Rodriguez sur No. 4, Gas Ridge, prep to run cas 2375 ft. Wm. V. Ballard et al's S. A. Land & Dev. Co. 1-A, I Perez sur, replace pump, 970 ft. Robert C. Hill's F. Schell 1, Sec. 234, Perretaux sur, dr below 500 ft. R. V. Hill's Boeck 1, J. F. Sheppard Sur No. 314, dr 50 ft. F. E. Kistler's E. E. Pirie 1, No. 1 M. Gotari sur, 10 mi se S. A., dr 1050 ft. M. E. Trussell et al's L. B. Carruthers, Sr., 1, Sam McCollough sur, bailing oil and gas abt 900 ft. C. J. Webster O&G Co.'s S. A. Sub Irr. Farms 1, lot 2, blk. 49, dr 1300 ft.

CALDWELL COUNTY — Bobrose O&R Inc.'s, Walker 3 (2-B), S. Seals sur, top chalk 2125 ft, set cas 2091 ft, td 2255 ft, swabbing oil. Hickman et al's Dickerson 1, John D. Rains sur, n end Salt Flat, brack in chalk 2173-75 ft, dry, dr deeper.

COLORADO COUNTY—C. B. Bunte et al's R. Matuska 1, J. Hennecke sur, dr 2610 ft.

COMAL COUNTY — Caldwell & Lanier's Byler 1, HE&WT Sur. No. 894, clean out 887 ft.

DIMMIT COUNTY—Motes-Campbell Co.'s Denton 1, tract 33-4, Blk. 60, Denton Colony, dr 735 ft.

DUVAL COUNTY—J. M. Anderson et al's Welder & Wood 1, Sec. 71, ne Gov't Wells, dr 200 ft. John F. Camp's Weil 2, Sec. 570, top Cole sand 1687 ft, now dr 1995 ft. Delange & Frates' Sevier 1, Sec. 213, 13 mi e Gov't Wells, dr 2645 ft. Duggan & Smith's Sutherland 2, sur 511, dr. Frank Gravis' Schallert 3, survey 255, testing 1401-5 ft. Hamill & Hamill's C. W. Hahl 2, sur 42, Gov't Wells, ru. Highland Oil Co.'s A. Lundvall 1, Sec. 42, sand 2235-63 ft, completing. Humble O&R Co.'s Paul White 7, Sec. 58, dr 2000 ft. J. A. Leidecker's G. W. Sutherland 1, Sec. 183, blk. 8, dr. Mag. Pet. Co.'s G. Wendt 8, Sec. 44, test gas 2286-2310 ft, core deeper; J. V. Allen 1, Sec. 42, move on. McGinley Corp.'s J. A. Lundell 2, Sec. 48, move on; Lundell 3, Sec. 48, lcn. Plymouth Oil Co.'s Hoffman 1, sur 113, ru. San Diego Oil Co.'s Bennett 2, Sec. 44, top sand 2291 ft, dr in. Sun Oil Co.'s Duval Ranch 1, Sec. 78, DI&A sur, 4 mi ne Gov't Wells, dk; Cuellar 2, sur 576, dr. The Texas Co.'s R. L. Brown 1, sec 574, dr 1800 ft. M. B. Johnson 1, sec 42, move on. Thomas & Tarver's Duval Ranch 2, sec 576, dr 2000 ft.

FRIO COUNTY — Amerada Pet. Corp.'s Halff & Oppenheimer 1, W. F. Halsel sur, 12 mi sw Pearsall, dr 3100 ft.

GOLIAD COUNTY — Plymouth Oil Co.'s Park 3, Park ranch, lcn being made. Rowan & Hope & Phillips Pet. Co.'s Irby 1, Jesus Ybarbo sur, sd 3345 ft. Slick-Seeligson, Inc.'s, Kauffman 1, P. F. Zock Oil Lease sub, sp.

GONZALES COUNTY—Kirby Pet. Co. & Bennett's Lum and Bouldin 1, Russell Ward sur, lcn, to dr into Edwards lime, abt 5000 ft. Luling O&G Co.'s DuBose 1, F. R. Whitner sur, sd 3220 ft.

GUADALUPE COUNTY — Marshall Eskridge's Behring 1, Williams sur, plug back from 2362 ft. Stover et al's Hoffman 1, dk. H. A. Suttle et al's O. J. Halm 1, J. Kent sur, dr 1770 ft in Taylor marl. A. W. Wormser's P. Hempel 1, G. W. Williams sur, dr deeper from 2043 ft.

JIM HOGG COUNTY—Cole Pet. Co.'s W. P. Allen 1, Halmuch sub No. 1 of Randado grant, lcn. Jack A. Tarver's Martinez 1, sur 623, reaming abt 2900 ft.

JIM WELLS COUNTY—Campbell & Parker's N. A. Hoffman 1, T. Morena sur, dr 1200 ft. F. A. Lain's Vernon Porter 1, tract 25, dr 600 ft. Larcro Gas & Pet. Co.'s W. D. Wade 1, sec D, W. H. Bode sur, materials on ground. Charles Long's Wade 1, sec C, Blk. 3, Wade ranch, sp.

KLEBERG COUNTY—Harrison & Hammond's Dennett 1, lot 7, sec 38, sd 500 ft.

LEE COUNTY—Paton Bros.' Turner 2, lcn.

LIVE OAK COUNTY—J. H. Durbin et al's J. Marbach 1, S. Hayes sur, dr 800 ft. Live Oak Pet. Co.'s Jim Harper 1, J. Poitavent sur, between Whitsett & Fant City, oil sand 1099-1100 ft, prep to set cas.

McMULLEN COUNTY—Jacob, Buzzini & Pickett's Jacob 6-A, Jacob sur No. 10, to move on. Longhorn Oil Co. & American Gas Co.'s Lark 1, E. W. B. Scrugham sur, sand 1007-14 ft, show oil, dr out plugs. V. G. Schimmel's Two Rivers Ranch 2, Sec. 59, Two Rivers sur, sd 400 ft, high water.

MEDINA COUNTY—James E. Greenlee's F. Fasseler 1, Sec. 799, ru. T. A. Ryal's G. Martin 1, Sec. 368, Henry Castro sur, sp.

MILAM COUNTY—M. W. Eiser's Citizens National Bank 1, blk 368, Wm. Punchard sur, re-dr 1842 ft. Glass et al's Ellison 1, Samuel Frost sur, no rept. Huff & Hock's J. W. Lee 1, D. Harmon sur, dr 1400 ft. Mitchalk & Clark's Johnson 2, Juan Josa Acosta sur, temp sd 2208 ft. Union Commercial Oil Co.'s Terry 1, Jose Leal sur, dr 1000 ft. Wilder, Van Russ & Ediston's Von Gonton 1, M. J. Delgado sur, dr 2875 ft.

NUECES COUNTY—Gulf Coast Oil Co.'s Perkins & LeGasse 2, sec 26, sd to rep rig 4883 ft. Gulf Port Oil Co.'s Frank Bliss 2, sec 406, sand 4555-58 ft, attempt dst; Dinn 1, dr 3785 ft; John Luby 1, blk 1, Mary J. Luby Share 1-G, Anna Collona Petronilla ranch, re-dr 350 ft. Houston Oil Co.'s Harrell 2-A, sec 28, blkg Xmas tree, td 4408 ft. Oso Drlg. Co., Inc.'s N. J. Roark 3, Villareal sur, sand 4403-8 ft, test 12 fourbles sw in 15 min. Saxet Gas Co.'s J. Dunn 9, E. Villareal sur, move on.

REFUGIO COUNTY—Humble O&R Co.'s O'Conner 3, J. Keating sur, ru.

STARR COUNTY — Adams & Modest's Wood 1, Por. 84, ru. B. & B. Oil Co.'s 1, Por. 86-87, lcn. Dr. J. N. Goodwin's Kelsey-Bass 1, sec 2, Por. 85, dr abt 1700 ft. Doyno-Pioneer Co.'s J. Salinas 1, Por. 39, dk. Hartstorn et al's Hinojosa 1, Por. 110, ru. Hoffman & Flowers' Wood-Goodrich 1, tract 5, blk 6, dr 400 ft. Jeffries-Lambert Drlg. Co.'s Starr Cattle Co. 1, Por. 89, blk 34, dr 900 ft. Myers & McCraghren's F. Doyno 2-A, blk 4, Por. 81, move on. Tarver & Nance's Kelsey Bass 6, Los Olmos, dr 300 ft.

UVALDE COUNTY—J. V. Scroggins et al's Mrs. Oliver Henry 1, Hughes-Kilgore sur, 6 mi nw Sabinal, making lcn.

VICTORIA COUNTY—Houston Oil Co.'s A. M. McFadden 1-A, IRR sur No. 20, dr 5625 ft. Humble O&R Co.'s P. Rydolph 1, Kemper sur, td 5990 ft, reaming 5935 ft. Slick-Seeligson Corp.'s McFadden 2, McFadden ranch, dr 5100 ft. The Texas Co.'s A. M. McFadden 3, J. M. Rine sur, dr 6410 ft. Union Oil Co.'s Keeran 1, M. de Leon sur, dr 6610 ft.

WEBB COUNTY—Cole Pet. Co.'s R. V. Benavides 78, sec 19, blk 8, M. Arispe Grant, ru. Hamill & Hamill's Sarah Lloyd et al 1, sec 23, lcn. O. W. Killam's E. Garcia 1, blk 2, sur 461, dk; Hogterp 3, blk 12, sur 110, completing 1511 ft. Newton Drlg. Co.'s A. Garcia 1, sur 52, dr below 2100 ft.

ZAPATA COUNTY—Donohoo, Stevens & Brown's A. Garcia 1, Share 2A, blk 7, C. Redondo sur, dr 1100 ft. Hunt & Polk's Ramirez 1, Share A, Villa Grant, testing 1025 ft. H. L. Sargent's A. Gutierrez 1, tract 2, blk 5, B. F. Nixon sub, Por. 10, dr 1450 ft. Windsor Oil Co.'s Martinez 1, blk 15, Duke sub, testing 1465 ft.

GULF COASTAL FIELDS

Rio Bravo Ushers in New Ascencion Parish Salt Dome; Another Coastal Field Indicated Along Shoreline.

WM. V. GROSS, *Staff Representative, Houston, Texas*

Darrow Dome Is Proven Capable of Production

Houston.—Another geophysical prospect was proven for production in the Louisiana Gulf Coast this week when Rio Bravo Oil Company's Community 1, Darrow dome prospect, was brought in flowing at the rate of 100 barrels per hour from Miocene sand at 4008-35 feet.

Due to the fact that the well is located about the center of a 600-acre community lease, and that the remaining 2100 acres of Rio Bravo holdings on the dome are held with leases containing no immediate drilling obligations, development work at Darrow will be orderly, at least so far as the discoverer is concerned.

Another condition which will retard development temporarily is lack of outlet. No pipe line passes close to Darrow.

Darrow dome, located in the extreme south portion of Ascencion Parish, is one of the only two domes east of the Mississippi River which have been proven for oil. The other is Sorrento dome, located 13 miles to the east. Darrow dome is about 1¼ miles north of the town of Darrow and about 35 miles south of Baton Rouge. The dome was subjected to three geophysical investigations. First a seismograph refraction outline was taken, then a seismograph reflection outline, and then a torsion balance was used on the prospect. Rio Bravo's Community 1 was staked on a location about in the center of the overlapping "highs" indicated by the three surveys.

Seven Shows of Oil

Although Darrow's first oil production comes from a little below 4000 feet, the disvovery well logged several interesting shows of oil. The first show of oil was encountered in a shale at 2146 feet, just below a water sand at 2144 feet. This was followed by a second show in a water sand at 2952-56 feet, lying immediately beneath a thick body of shale which was logged from 2784 to 2936 feet. The third show occurred in another water sand at 3357-62 feet. Beneath a stratum of brittle, sticky shale at 3505-72 feet, the fourth show was encountered in a sandy shale at 3576-78 feet. The fifth show was cored at 3630-31 feet, and a sixth show of oil at 3953-62 feet. Then the final show at 4008-35 feet, in which 29 feet and 10 inches of .008 gauge screen was set.

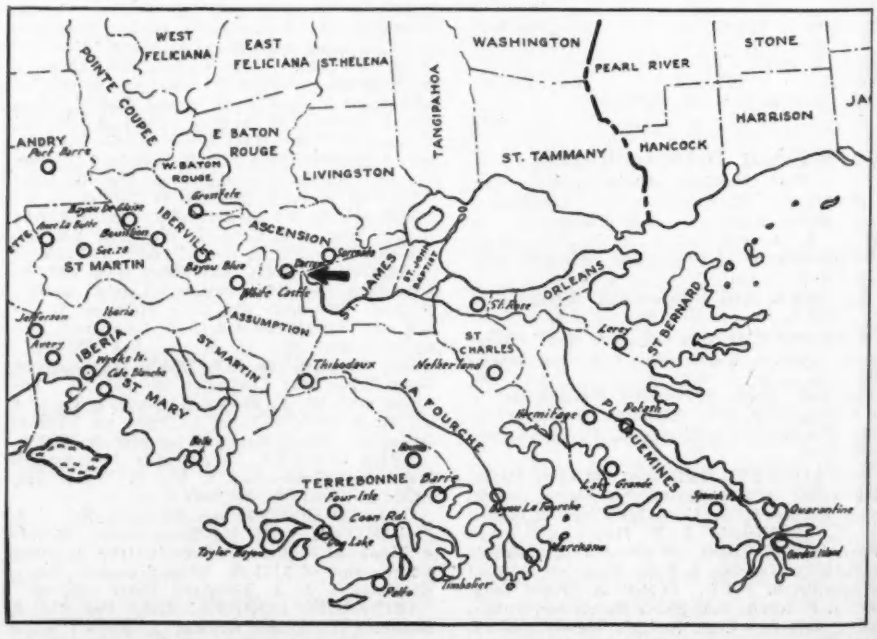
So far as the log is concerned, domal indications were conspicious by their absence. Cap rock, salt, and anhydrite were not encountered, a fact that seems to lend strength to the theory that Darrow is a deep-seated dome, and possibly a non-piercement type of dome, especially in view of the fact that the well is located in the center of a triple-checked geophysical survey's indicated "high".

Only two other tests have been drilled in the vicinity of what is temporarily recognized as the center of the Darrow play, the exact location of Community 1 being 200 feet north and 1500 feet east of the northwest corner of Section 31-10s-2e, on the Willow Grove Plantation lease of Mrs. W. J. O'Neil. In 1929 Gulf Refining Company's Belle Helene Sugar Company 1 was abandoned in salt water sand at 5600 feet, having recorded no important showings. This wildcat was in Section 27-10s-2e, and is reported to have been drilled either for condemnatory or lease obligation reasons. The other test, located about 2000 feet east, was drilled to 3700 feet and abandoned.

Disposition of Oil

When the initial production of Community 1 was gauged at 100 barrels per hour of 28.5 gravity oil, corrected, the pressure on the half-inch choke was 525 pounds. Shortly after the choke was reduced to quarter-inch, with the result that the well flowed 600 barrels in nine hours. After the initial head of pressure quieted, the gauge settled to 500 pounds. Then the well was shut in for lack of storage, there being but 2000 barrels of tankage on the lease.

Some interest is felt as to what Rio Bravo will do with the well's production. No plans for a pipe line have been announced, and it is reported the Rio Bravo wishes to avoid construction of one if practical. Chalmette Refining Company, Pan American Petroleum and Transport Company and Shell have refineries at New Orleans to which Darrow production could be barged by way of the Mississippi River. In Baton Rouge, also located on the river, Standard Oil Company of Louisiana, has a refinery.



Showing relation of Darrow dome, second proven salt dome east of the Mississippi, to other productive domes and prospects in the Louisiana Gulf Coast.

New Oil Field Indicated At Spurger, Tyler County

Houston.—Indications of another Texas Gulf Coastal oil field along that portion of the shoreline trend passing through Tyler County came as a result this week of a drill stem test of Republic Production Company and Houston Oil Company's Sterne Fee 1, which showed 750 pounds pressure and one-half joint of high gravity gasoline through a three-eighths-inch on top of the drill stem and a three-quarter-inch choke on bottom. The tool, which was left open one minute, was set on bottom at 4708 feet, according to reports. Sterne 1 was estimated as initially producing gas at the rate of 30 million cubic feet per day. Information coming from the derrick floor credits the driller's report, dated September 25, with stating the formation from 4692-98 feet was shale, followed by sand with a good oil odor at 4698-4702 feet.

It is not unlikely this strike is a continuation of the Conroe trend across San Jacinto and Polk Counties to the northeast. The well is situated 8384 feet east of the west line and 484 feet south of the north line of the Adolph Sterne Survey. This places it about four miles southeast of Spurger, about 1½ miles southwest of the Neches River, and about 5½ miles south by east of the dry, but interesting dry hole drilled to around 4200 feet by Wentz et al. In view of this location, the well is just south of the Lagarto-Reynosa outcrop, about half as far south of it as present production in Conroe. The difference in distance from the outcrop between Conroe and the Spurger area wildcat would seem to account normally for the difference in depth at which the sand was encountered, or about 1000 feet as Conroe production is obtained about 5000 and 5100 feet. One thousand feet has been expressed as a normal dip for the distance. Other fields lying immediately north or south of the Lagarto-Reynosa outcrop and in what is supposed to be the same trend are: Conroe, Raccoon Bend, the production near Livingston in Polk County, Brenham and Pettus.

Republic Production Company and Houston Oil Company, operators who earlier in September discovered another coastal field in their Ariola prospect, which was held largely in fee, own or have lease on about 20,000 acres in the Spurger area. While the holdings are largely in a solid block it is checkerboarded with respect to fee and leased property. The nearest pipe line, or immediately available outlet for the anticipated production, is Sun Oil Company and Yount-Lee Oil Company's line from East Texas to Beaumont.

Further information on the Spurger prospect is not available as Republic Production Company is making a closed test of the wildcat and is withholding all information.

State May Ask Court to Void Conroe Injunction

Austin, Texas.—Indications in Austin are that the attorney general will request that the injunction obtained by the Alpha Petroleum Company be declared void, as it was not issued from a Travis County district court.

Meanwhile, the Texas Railroad Commission has suspended the order pending outcome of the litigation. This was done voluntarily in an effort to treat all operators in the field fairly.

The injunction was obtained in the district court at Conroe on Friday, September 23, and the commission suspended the order the next day.

Alpha Petroleum Corporation in its petition declared that the entire order was based on a law unconstitutional, and then specifically excepted to the 240-barrel allowable and the method of spacing required under the order.

Although the law specifically states that suits against the commission must be filed in Travis County courts, the plaintiffs named other parties in their petition and for this reason contended that the district court at Conroe held jurisdiction.

It is expected that the next action of the attorney general will hinge on this question. If it becomes impossible to have the restraining order voided on this basis, trial of the case will be required before final disposition can be had.

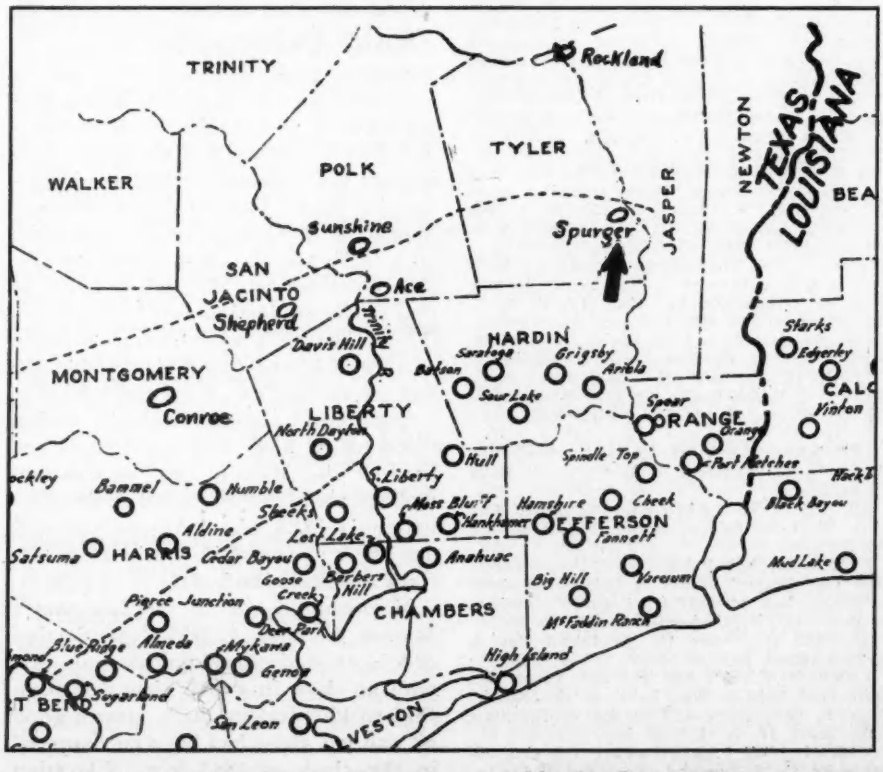
Houston-Republic Stake Offsets to Gulf At Ariola

Houston.—That Houston Oil Company and Republic Production Company will protect property lines on the recently proven prospect at Ariola dome, Hardin County, was seen this week in announcement of two new locations, east and south offsets to Gulf Production Company's Kirby Lumber Company 1, drilling below 2360 feet.

The offsets are for Ariola Fee 2 and Ariola Fee 3.

Houston Oil Company is drilling below 3630 feet in Ariola Fee X-1, is clearing location for Ariola Fee Y-1, and rigging up on Ariola Fee Z-1.

Ariola Fee 1, discovery oil well of the prospect which was completed at 3995 feet for 320 barrels net oil about the middle of September, is producing at the rate of about 300 barrels.



Showing relation of location of Spurger area wildcat to Lagarto-Reynosa outcrop (dotted line) and to the shoreline trend passing through Conroe, Pettus and Raccoon Bend.

Texas Gulf Coast Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
BARBERS HILL FIELD—		
Mills Bennett, Kirby 4	2245	4204
Barber B-1	*	5250
Sun Oil Co., Annie Higgins 3	300	3018
Texas Gulf Producing Co., Kirby C-4	1815	3975
CONROE FIELD—		
Humble Oil & Refining Co., So. Tex. Dev. Co. 7	1200	5166
HANKHAMER FIELD—		
Gulf Prod. Co., Boyt 16	1584	4869
HIGH ISLAND FIELD—		
Yount Lee Oil Co., Cade 30	510	5194
HUMBLE FIELD—		
Sun Oil Co., River 61	80	1280
The Texas Co., House 26	126	3831
J. D. Clay, Bender 3	75	1200
MOSS BLUFF—		
Texas Gulf Sulphur Co.	*	1185

Louisiana Gulf Coast Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
DARROW DOME, (Ascension Parish)—		
Rio Bravo Oil Co., Community 1, (discovery well)	2400	4037
EAST HACKBERRY FIELD—		
Jim Oil Co., Erwin 7, Sec. 13-12s-10w	*	3025

Wildcat Drilling Report

(Wells shut down not included)

ACADIA PARISH — Yount Lee Oil Co., Housierre Latrielle 11, Jennings, dr gbo 1100 ft.

ASCENCION PARISH—Union Sulphur Co., United Lands 22, Sorrento, dr w sn at 4055 ft.

CALCASIEU PARISH—Cannon & Hughes, J. S. Reed 1, sec 18-10s-12w, lcn. Dr. T. W. Irvine, Minnes 1, sd at 745 ft. The Texas Co., Miller Est. 1, Edgerly, sd at 160 ft. Magnolia Pet. Co., B. T. Waite 2, Iowa, dr 6462 ft. Union Sulphur Co., Moss 3, Lockport, td 6547 ft, woc at 6539 ft. Emerson & Starck, Ind. Lbr. Co. 1, Starks dome, dr st stuck at 4136 ft. Union Sulphur Co., Fee 770, dr 2211 ft; Fee 772, Sulphur, dr in salt at 4061 ft; Fee 774, dr rk 1990 ft. Gulf Ref. Co. of La., Gray 6, Vinton, dr heaving shale 3342 ft. Marrs McLean Gray 14, Vinton, dr 2760 ft. Vinton Petl. Co., Mathilda Gray 5, Vinton, dr 3700 ft.

CAMERON PARISH — Calcasieu Oil Co., Watkins 37, E. Hackberry, dr 3085 ft. Mills Seiss Oil Co., Vincent 1, Hackberry, dr 2180 ft in rk. Union Sulphur Co., Humble 3, E. Hackberry, dr rk 5650 ft. Yount Lee Oil Co., Carter Sweeney 3, Old Hackberry, dr 3735 ft; School Land 11, Old Hackberry, dr 5270 ft.

IBERVILLE PARISH — Shell Pet. Corp., Wilbert 6, White Castle, dr 3595 ft. Standard Oil Co. of La., Myrtle Grove-Wilbert 3, dr rk 1340 ft.

JEFFERSON DAVIS PARISH—Shell Pet. Corp., O. A. Fontenot 1, Iowa, in sn shwg oil at 5206.

LA FOURCHE PARISH—The Texas Co., L. L. E. Leesville 6, Leesville, lcn in sec 26-21s-21e.

PLAQUEMINE PARISH—Freeport Sulphur Co., Cockrell-Moran 3, Lake Washington dr porous lime at 1397 ft; Cockrell Moran 4, dr past 1137 ft; Cockrell-Moran 5, dr 377 ft. The Texas Co., State Garden Island Bay 5, Garden Island Bay, dr 370 ft.

TERREBONNE PARISH—The Texas Co., State Dog Lake 6, Dog Lake, dr rk 2137 ft; L. L. E. Lake Barre 4, Lake Barre, dk; State Lake Barre 17, dr rk 2000 ft.

VERMILION PARISH—Pure Oil Co., Alliance Tr. Co. 3, Gueydan, lcn in sec 34-11s-1w.

VERNON PARISH—Minerals Devision of Llano Co., Llano Del Rio 1, 2 mi sw Leesville, sd at 1715 ft.

LOUISIANA FIELDS

Test Five Miles North of Zwolle Believed on Separate Structure — Completion Delayed.

Zwolle's One Well Out of Five Tries Is a Good One

Shreveport, La.—One of the largest wells completed in the southeast part of the Zwolle east field was completed last week when W. F. Lacey's McNeely 4, SE SE Section 14-7-11, was brought in at 2606 feet in chalk, flowing 1500 barrels of oil daily through quarter-inch choke. Zwolle marl was logged at 2450 feet and chalk at 2495 feet; six-inch casing was cemented at 2400 feet.

Four dry holes, two of which were outside tests, were also completed in Zwolle during the week.

Zwolle, which went without a new location the preceding week, had eight new tests launched during the past seven-day period. Five of the new tests were in the southeast part of the field, two in Section 13-7-11, two in Section 14-7-11, and one in Section 10-7-11. One was in the southwest part of the Zwolle townsite area in Section 3-7-13, while two were outside tests, one being Roshko Labarre's Maines 1, SE NE Section 35-8-11, and the other J. H. Askew's Henderson 2, SW SE Section 31-8-10.

Test on Structure North of Zwolle Delayed By Plug

Shreveport, La.—Testing of the chalk producing possibilities of Gibson-Johnson and L. D. Higgins' Frost-Johnson 1, NW SE Section 19-9-13, Sabine Parish, on the Converse structure, identified by H. D. Easton, discovering geologist of the Zwolle chalk rock field, as a separate structure from Zwolle, and approximately five miles north of that field's production, was delayed during the last week when operators started to drill in and found plug within 300 feet of the top.

Eight and one-fourth-inch casing cemented at 1548 feet one foot below base of the Midway, was recemented and the well is to be tested again. Elevation is 252.8 feet. A good oil and gas show appeared in a drill stem test from 1547 to 1624 feet.

Meanwhile C. M. F. Oil Company's Musser & Aaron 1, NW NW Section 32-9-13, tested three fourbles of mud with no show in a drill stem test from 1878 to 1905 feet in chalk, after a good oil and gas show had been encountered in the chalk at 1883 feet. Elevation is 235.6 feet.

Sandfield Oil Company (formerly Cloud and Bolin) have spudded Bowman-Hicks 1, Section 26-9-13, a third test for this structure.

All of these tests are headed for the contact of the upper and lower Cretaceous around 3100 feet but all are giving the chalk horizon a test.

DeSoto Parish Wildcat Makes Small Heads of Oil

Shreveport, La.—Warren & Nicholson's Jim Guy 1, Section 3-11-13, a De Soto Parish wildcat, about three miles south of Mansfield, parish seat, last week made small intermittent heads of 42 gravity oil from 2767 feet probably in the Tokio.

A joint of 6⅝-inch casing gave way in the well, necessitating running of tubing which had to be pulled and cleaned after being run. The well may make a commercial well, although due to condition of the hole and the equipment this is uncertain.

This well, according to some geological theories, refutes the idea of a large east-west fold extending through this area. No closure is predicted.

Start First of Three Tests North of Hosston Field

Shreveport, La.—Location for the first of three contemplated tests north of the shallow Hosston field of Caddo Parish in a semi-wildcat area was made last week by Caddo Prairie Development Company for Nichols 1, NE SW Section 10-22n-15w.

Besides this location and eight for the Zwolle field of Sabine Parish there were two locations made for inside wells in the Union Parish part of the Monroe gas field.

A location made by E. S. Goens for Frost Lumber Company 1, Section 17-22-2e, in Union Parish, week before last, is a wildcat to test the oil producing possibilities of one of the flanks of the Monroe Uplift on which is located the large Monroe gas field situated in parts of three parishes. Goens' location is on a 4500 acre block and will go to 3200 feet. It is eight miles southeast of the abandoned Oakland oil field in Union Parish, a field that yielded 100 barrels daily for a time about eight years ago, and is six miles northwest of the Spencer High.

North Louisiana Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
CADDO PARISH—		
D. C. R. Oil Co., Caddo School Board 1, 16-19-14	75	2449
RICHLAND PARISH—		
Pelican Nat. Gas Co., Noe 1, 14-17-5e	¶15	2353
SABINE PARISH (Zwolle)—		
W. F. Lacey, McNeely 4, 14-7-14	1500	2606
S. A. Lane et al, DeKeyeser 1, 23-7-11	*	2930
Skidmore Oil Co., G. Martinez 1, 3-7-13	*	2463
Texas Co., Stille 4, 33-8-11	*	2650
W. C. Turnbow, Williams 4, 13-7-11	*	2632

New Operations

ACADIA PARISH—Olympic Oil Co., Inc., Jennings, Leckelt 1, 42-9s-2w, 1150 ft s and 75 ft w ne cor sec.

CADDO PARISH—Caddo Prairie Dev. Co., Shreveport, Chas. Nichols 1, 10-22n-15w, 660 ft n and 400 ft e sw cor ne¼ sw ¼ sec. Ark. La. Pipe Line Co., Shreveport, F. E. Gloyd 1, 34-23n-16w, 100 ft s and 660 ft e nw cor nw¼ ne¼ sec.

CALCASIEU PARISH — The Texas Co., Shreveport, Miller Bros. 1, 27-9s-11w, 125 ft s and 100 ft e nw cor ne¼ nw¼ of sec.

CAMERON PARISH—Jim Oil Co., Lake Charles, La., Erwin 9, 13-12s-10w, 150 ft e of No. 1 sec.

PLAQUEMINES PARISH (Drill)—Freeport Sulphur Co., Freeport, Texas, Cockrell 5, —20s-26e, approx 10,835 ft n and 480 ft w from se cor of sec.

SABINE PARISH—Lee & Burnett, Gladewater, Texas, Travis 1, 13-7n-11w, 510 ft s and 150 ft e nw cor ne¼ nw¼ sec. Wm H. Ungerman, Many, La., Francis Cross 1, 25-8n-11w, 53 ft s and 146 ft w ne cor sw¼ se¼ of sec. Askew & Ellis, Shreveport, Hendricks 1, 31-8n-10w, 330 ft n and 330 ft w se cor of n¼ ne¼ of sec. Askew & Ellis, Shreveport, McNeely 2-E, 14-7n-11w, 150 ft w and 150 ft s ne cor sw¼ ne¼ of sec; No. 2, 14-7n-11w, 140 ft s and 140 ft w ne cor se¼ ne¼ of sec. Jule Alford, Tr., Tyler, Texas, M. R. Stoker 1, 10-7n-11w, 210 ft n of s line of ne cor and 210 ft w of e line of ne¼ sw¼ of sec. O. J. Rowe et al, Vivian, La., Anna Williams 2, 13-7n-11w, 200 ft e and 205 ft n sw¼ nw¼ of sec. Askew & Ellis, Shreveport, McNeely 3, 14-7n-11w, 150 ft s and 150 ft e nw cor se¼ ne¼ of sec; No. 5-A, 14-7n-11w, 150 ft n and 150 ft w se nw¼ ne¼ of sec; Henderson 2, 31-8n-10w, 183 ft w and 445 ft s ne cor sw¼ se¼ sec.

UNION PARISH (Drill)—Southern Carbon Co., Monroe, La., Thomas 62, 30-20n-4e, 1920 ft s and 1920 ft w ne¼ cor sec. G. H. McHenry, Tr., Monroe, La., John J. Potts 1, 15-21n-3e, 2044 ft n and 394 ft w of e¼ cor sec.

Wildcat Drilling Report

(Wells shut down not included)

BOSSIER PARISH—Steckol & Breazeale, Nattin 1, sw ne 15-22-14, sd 2950 ft.

CADDO PARISH — Louanna O&G Co., Cushman 2, 33-19-16, tested est. 15 mil ft gas in ds test, cemtd 6-inch cas 2740 ft. Ark. La. P. L. Co., F. E. Gloyd 1, nw ne 34-23-16, sp 13⅜ cas 210 ft (5500 ft test). Prairie Dev. Co., Nicholson 1, ne sw 10-25-15, lcn.

CLAIBORNE PARISH—United Gas Pub. Serv. Co. et al, Warren Brown et al, 1-19-6w, top oolitic lime 4432 ft, blg to test at 4490 ft, after cemtd back from 4619 ft. Robertson & Aurand, Smith 1, 8-21-7w, rig.

CONCORDIA PARISH—M. M. Stoker et al, Gillespie 1, 56-8-10, dr 3600 ft.

DE SOTO PARISH — DeSoto Dev. Co., Nickie 1, 7-13-12, rig. Walters & Nicholson, Jim Guy 1, 3-11-13, 6-inch 2745 ft, cas parted, ran 2-inch tub; made intermittent heads of 42 grav. oil, co tub, td 2767 ft. Honeycutt O&G Co., Porter 1, 26-12-13, rig. Jack Whitson, Sanders 1, sw sw 19-11-13, sd 961 ft. E. T. Oakes, Johnson 1, 30-13-15, core 4110 ft. Potter et al, Dowling 1, 31-14-14 (formerly S. A. Guy), claim 2 ft sand, sd 3068 ft. Warren & Craig, Wagner 1, 5-12-14, dk.

GRANT PARISH—Robichaux et al, Bradford 1, 16-9-1e, rig.

JACKSON PARISH — Southern Advance Paper Bag Co., Fee 1, sw nw 19-15-3w, dr 1760 ft.

MOREHOUSE PARISH—H. W. Snowden, Mayers 1, ne ne 15-22-7e, dk. Feazel & Kalil, Davenport 1, 28-21-6e, dr 2380 ft.

NATCHITOCHES PARISH—Saline Bayou Dev. Co., Bodcaw Lbr. Co. 1, 9-12-5, sd 1844 ft. Natchitoches Pet. Co., Edenborn 1, 4-11-6, dr 1430 ft. Dr. H. S. Gerson, Smith 3, 11-10-8w, arr set cas, td 530 ft. Texana Oil Co., Clarke-Morse 2, 23-5-6w, repr rig, td 3450 ft. J. B. Oil Co., Hankins 1, 67-10-7w, sp.

SABINE PARISH—J. M. Bridges, Moore 1, ne nw 5-9-12, cemtd 6-inch 3228 ft, sand 3245-48 ft, arr dr in, td 3248 ft. J. H. Askew, Lyons 1, 31-8-10, 6-inch cas 2445 ft. J. R. Bunn, Sabine 1, sw ne 9-7-13, 3-inch cas 2035 ft, testing show oil and gas, td 2422 ft. R. L. Gay, Tr., Long-Bell A-1, nw nw 10-8-13, core lime and shale 6357 ft. Loring Oil Co., Bowman-Hicks 21, 16-7-12, elev 247 ft, top marl 2473 ft, top chalk 2483 ft, tested dry through ds 2485 ft, arr deepen, 5000 ft test. State Prod. Co., Lites 1, 28-8-11, dk. H. C. Maulding, Moores 1, se ne 16-7-13, dr 1670 ft. LeGrand & Jackson, McGough 1, 2-8-10, sd wo cas, td 2200 ft. Magnolia Pet. Co., Williams 2, nw ne 6-7-10, swabbing, td 2653 ft. C. M. F. Oil Co., Musser & Aarons 1, nw nw 32-9-13, elev 235.6 ft, base Midway 1580 ft, top marl 1638 ft, top chalk 1664 ft, tested 3 fourbles mud in ds test 1878-1905 ft, in chalk after oil show, dr chalk 1950 ft. Gibson-Johnson & Higgins, Frost-Johnson 1, nw se 19-9-13, elev 252.8 ft, base Midway 1547 ft, cemtd 8¼ cas at 1548 ft after ds test showed oil 1616-24 ft, dr in found plug 300 ft from top, recemtd cas 1548 ft, td 1624 ft; Frost-Johnson 2, 15-9-13, rig. Sandfield Oil Co. (formerly Bolin & Cloud), Bowman-Hicks 1, ne ne 26-9-13, sp. Simmons et al, Fleming 1, se se 11-8-13, dk. P. L. Miller, Chadick 1, 32-8-10, 6-inch 2480 ft, swabbing, td 2689 ft. Supreme Oil Co., Pruitt 1, 30-8-11, 6-inch 2226 ft. Kilgore et al, Pate 1, 32-8-11, tested dry, sd 2704 ft. Triangle Drilling Co., La. Long Leaf 1, 11-6-11, co td 4013 ft. Helis et al, Sabine 1, 28-8-11, 10-inch 41 ft. Byers Oil Co., Bishop 1, 16-7-13, 10-inch 41 ft. C. W. Smith et al, Pattison 1, se nw 30-10-11, dk. W. M. Ungerman, Cross 1, sw se 25-8-11, move in rig. Roberts & Sledge, 4 L 1, ne se 29-8-10, dk pat. Coming Oil Co., Williams 1, se sw 31-8-10, rig. Roshko Labarre, Maines 1, se ne 35-8-11, lcn.

VERNON PARISH—Llano Coop. Colony Fee 1, 34-2n-9w, dr sandy shale 2016 ft. Earl Jones, Willis 1, 32-3n-9w, dk.

WEBSTER PARISH—Pearce et al, Ambrose 1, 22-20-10w, fsh 2100 ft.

WINN PARISH—P. V. T. Oil Co., Southern Adv. Paper Bag Co. 1, nw sw 28-13-5w, fsh 1040 ft.

UNION PARISH—E. S. Goens, Frost Lbr. Co. 1, 17-22-2e, lcn.

ARKANSAS FIELDS

Southwest Arkansas Gets Active With Ten Wildcats

Texarkana, Ark.—Southwestern Arkansas' wildcatting activity was given impetus during the week ending September 28 by the announcement of three more locations, two in Miller County and the other in La Fayette County.

In Miller County, Fitzwater and associates made location for E. L. Beck 2, SW SE Section 33-15-26, offsetting their E. L. Beck 1, in the same quarter, which is making some oil from 2951 feet in the upper Trinity. The other Miller County location is W. S. King's E. L. Beck 1, NE NW Section 35-15-26. In La Fayette County Sam E. Wilson, Jr., has materials at location for C. F. Smith 1, NW SE Section 24-19-25.

This gives Miller and La Fayette Counties a total of 10 tests counting locations, derricks, rigs and drilling operations.

Considerable leasing is going on in both counties. The flurry was started by the three oil shows below 2900 feet in Fitzwater and associates' E. L. Beck 1. Considerable secrecy has been thrown about this well and only a few people allowed to visit it recently. It is reported flowing about one barrel of oil per hour through drill stem full of mud, at total depth of 2951 feet. Four and one-half-inch casing may be cemented. A string of 6⅝-inch casing was cemented at the first sand showing oil encountered at 2919 feet.

Northwest Arkansas Gasser Completion Has Small Flow

El Dorado, Ark.—Franklin County, Northwest Arkansas, yielded a small gas producer during the past week, Ozark Natural Gas Company's Monroe 1, NW NE Section 13-8-29, being gauged for three million cubic feet with 490 pounds rock pressure at total depth of 2380 feet.

Arkansas Fields Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
FRANKLIN COUNTY—		
Ozark Nat. Gas Co., Monroe 1, 13-8-29	¶3	2380

Wildcat Drilling Report

(Wells shut down not included)

CLEBURNE COUNTY — Fred S. Craver, Donithan Lbr. Co. 1, sw sw 34-11-9, dr 690 ft.

COLUMBIA COUNTY—Kendall Oil Co., Fullenwider & Kitchen 1, ne ne 13-17-22, sd 2175 ft.

DREW COUNTY—Cooperative Dev. Co., Ogles 1, 35-13-5, deepened to 3274 ft, sd black shale.

LA FAYETTE COUNTY — Fox & Langford, Coleman Bros. 1, se se 25-16-25, dk. Sam Wilson, Jr., Smith 1, nw se 24-19-25, materials.

LINCOLN COUNTY—L. B. Cook, Tr., McGehee Pltg Co. 1, 5-8-7, sd 3250 ft.

LITTLE RIVER COUNTY — American Portland Cement Co., Fee 1, sw ne 21-12s-32w, dk. Harrell et al, Taafe 1, 25-12s-32w, cored sw sand 2917-25 ft, sd in red shale 2968 ft.

MILLER COUNTY—Fitzwater et al, E. L. Beck 1, sw se 33-15-26, flowing approximately one bbl oil per hour through ds hf mud, may run 4½ inch cas, td 2451 ft; E. L. Beck 2, sw sw se 33-15-26, materials; C. J. Norsen 1, se sw 20-15-27, 10-inch 121 ft; Fouke 1, ne ne 11-17-27, 12½ cas 105 ft. W. S. King, E. L. Beck 1, ne nw 35-15-26, lcn. Goodwin et al, E. A. McCowan 1, nw se 22-15-28, rig. Duluth-Ark. Oil Co., Stone 1, sw se 32-14-26, plugged back from 2535 to 2300 ft, arr make ds test 2252-2300 ft. Lenz et al, Arthur Dean 1, nw se 19-15-25, rig.

ST. FRANCIS COUNTY—Kentucky-Ark. O&G Co., Inc., Britton 1, ne nw 1-4n-1e, dr chalk 3310 ft.

NEW MEXICO . . . ROCKY MOUNTAIN

Dry Creek Well Expected to Make 400-500 Barrels. Cut Bank Reports More Locations. Aspen Reports Gas Show.

Expect Fiddler Creek Test To Make 25 Barrels Daily

Osage, Wyo.—Julius C. Peters wildcat well on the Fiddler Creek structure, southwest of the Osage field in eastern Wyoming, which was to have been shot to determine its possibilities as a producer last week, met with a delay when the first shot failed to go off and it became necessary to prepare for another. No result of this second shot has been announced. However, recent visitors at the well state that it is possibly good for about 25 barrels per day. At present the test is bottomed in the Muddy sand, a streak of which at 4507 feet is to be shot with the idea of increasing the production. The well is Weitzell 1, SE SE NW Section 30-46-64, about 2½ miles southwest of the nearest producing wells in the Osage field.

Regardless of whether the well finally proves commercial, it has been an important discovery since it proves the existence of oil and gas in some quantity southwest of the field.

Dry Creek Test Appeared Failure, Will Produce

Red Lodge, Mont.—Ohio Oil Company's Caldwell 8 made 400 to 500 barrels when allowed to flow in the sump from its location in the eastern part of the Dry Creek field. It is being hooked up to production tanks and definite knowledge of its worth will be available next week. It is believed that once on production the well will increase its production, as has been the case with others in the field.

This well had appeared to be a failure. It was drilled through the Tensleep horizon at 6887 feet and then started to plug back to test the Frontier sand. However, upon reaching the bottom of the Dakota, it was cleaned out and unexpectedly started to flow, spraying oil over the surrounding country. Casing was cemented and a production test started.

Diagonal Offset

Well is a diagonal offset to Carbon Oil & Gas Company wells on the Beartooth leases. The Carbon Oil & Gas Company's Beartooth-Armstrong 1, farther east than any other in the field, originally was completed in the Dakota for 1800 barrels. However, after having produced a considerable quantity of oil, it turned to water, and efforts to shut off this flow completely have proved ineffectual. The company has, in the meantime, drilled McMinn 1 to the Frontier and then suspended further operations pending the outcome of the Ohio Oil Company's Caldwell 8. It is believed now that McMinn 1 will be drilled to completion in the Dakota sand.

Ohio Oil Company's Robinson 7 is standing at 5735 feet, awaiting completion of other wells in the field, and the Margaret Souders 9 has rig up but will not be started for some time.

North and east of other producers in the field, Bowman 11, which found gas production in the Frontier sand and thereby proved a material extension to the proved area of the district, is coring near the top of the Dakota at 5606 feet. An interesting development should be expected here within another week.

Kevin-Sunburst West Side Getting Delayed Attention

Shelby, Mont.—Four near completions are reported in the western sector of the Kevin-Sunburst field, north and northeast of the town of Kevin. It is this part of the field in which the original discoveries were made. Later discoveries farther to the east and litigation about land titles took operations out of this sector and recent years have seen little or no interest displayed there. Recently Fred Platt, mining engineer and geologist, by a study of well logs in the west side decided that the chances for production in this area were as good or better than ever, and he with associates formed a "no-jack" company to drill on the Houghon property on Section 11-35-3w. Immediate interest was manifest by various operators and activities took on new life.

Aspen Structure Wildcat Reports Show of Gas

Lyman, Wyo.—Trans-Western Petroleum Company, a subsidiary of the E. L. Doheny interests, reported recently that it had encountered sufficient gas in its wildcat well on the Aspen structure in southwestern Wyoming, to cut the drilling mud, and that the well was coring ahead below 4800 feet. The test is No. 1, SE Section 6-14n-118w, in Uinta County. No gauge was made of the showing. The original operation on this structure was started five years ago by Olson & Zimmerman and Deseret Oil & Refining Company. The test encountered many difficulties and was finally turned over to the Doheny interests of California. A new hole was started and at 2600 feet reported production good for about 15 barrels per day. The test was shut down at 3216 feet last fall, and in the spring rotary equipment was installed.

Three Completions Due in Cut Bank Within Week

Cut Bank, Mont.—More new locations were announced in the Cut Bank area last week. Montana Power Company will drill a wildcat well only two miles to the northeast of the corporate limits of the town and seven miles southeast of the Roy Tarrant interests' drilling well Reickhoff 1. The second location was announced by the Tarrant group; it is to be called Longmiller 1, and is located three-fourths of a mile southeast of the company's Haglund 1, the first producing oil well to be completed southwest of the Cut Bank gas field.

Three wells are nearing completion in the southwestern part of the Cut Bank field in that sector which has been partially proved to be oil bearing by the Tarrant discovery. It is expected that some, or perhaps all, of these will be finished before the end of another week.

Rocky Mountain Field Developments

MONTANA

New Operations

Company, Well and Location	Initial Production Bbls.	Depth
GLACIER COUNTY (Cut Bank Field)—B. E. Adams, Britton 1, se ne 14-36-6w.		
YELLOWSTONE COUNTY (Molt Structure)—Rice-Fulton et al, 20-2n-23e.		

Completions

GLACIER COUNTY (Milk River Structure)—	
Milk River Petroleum Corporation, ne 28-36n-12w	* 4250

Wildcat Drilling Report

(Wells shut down not included)

BROADWATER COUNTY—Capitol O&G Co., nw 7-8n-1e, fsh 2002 ft.

CARBON COUNTY—Corbett Roy. Co., sw se, 1-6s-23e, reset 8-inch at 1120 ft, td 1150 ft. Jack Creek O&G Co., 2, se 15-7s-23e, dr 1208 ft.

CARTER COUNTY—E. T. Moorehead, sw 34-4s-57w, wait for 12½ inch at 362 ft.

FALLON COUNTY—H. W. MacDonald's 1, sw 28-8n-60e, dr bel 1920 ft.

FERGUS COUNTY—Melton Corp., 1, sw 24-21n-17e, prep to run cas for w.s.o. 3300 ft.

GALLATIN COUNTY — Montana Gas & Pete Corp., Adams 1, 35-1n-2e, dr 1675 ft.

GLACIER COUNTY—Tarrant et al, Yunck 1, nw nw 12-34-6w, dr 2100 ft. Tarrant et al, Reickhoff 1, ne 3-34-6w, dr 2775 ft. Montana Power, Simereo 1, n½ 5-33n-5w, dr 400 ft.

GOLDEN VALLEY COUNTY — Golden Valley Oil Co., 2-6n-22, set 8¼ inch at 3400 ft.

HILL COUNTY—Fargo Oil & Gas Co., 29-37n-15e, set cas for w.s.o 700 ft.

LIBERTY COUNTY — Peoples O&G Co.,

nw 17-35-6e, run cas to so cave 2350 ft. Dohm et al, Millen 1, sw 10-37-5e, fsh 295 ft.

PETROLEUM COUNTY—St. Cloud O&G Co., sw ne 20-34-24e, stand 515 ft.

PONDERA COUNTY—Bell-Adams, Venetz 1, 21-27-4w, fsh 1700 ft.

SWEETGRASS COUNTY — Shoshone Consolidated Oil Co., nw nw 23-2n-15e, dr bel 6000 ft.

TOOLE COUNTY—Liquid Gold Oil Co., 1, 25-36-1e, dr 2510 ft.

VALLEY COUNTY—Opheim O&G Co., ne 28-37n-38e, mvg in.

YELLOWSTONE COUNTY—Spokane-Laurel Oil Co., sw se 30-2s-24e, ur 6⅝ inch 1600 ft. Peter Antonioli, ne ne 2-2n-25e, wait for cas, 2370 ft. Rice-Fuleton et al, 20-2n-23e, mvg in.

WYOMING

Completions

Company, Well and Location	Initial Production Bbls.	Depth
WESTON COUNTY (Osage Field)—		
Chadron-Osage Oil Co., ne se 31-46-64	*	1640
Rap-Osage Oil Co., Logan McCullough 2, nw nw 24-46-64	*	1616

Wildcat Drilling Report

CONVERSE COUNTY—Converse O&G Co., sw sw 27-33n-72w, dr ahead below 2350 ft.

CROOK COUNTY—St. Onge O&G Co., ne se 20-53n-61w, dr 450 ft. McWethy et al, 1, 1-49n-67, resume after temp, sd 600 ft.

FREMONT COUNTY—Ward O&G Co., 28-34-90, dr hard formation 4200 ft. Yellowstone Oil Co., Gabus 1, sw 14-38-94w, 2315 ft.

LINCOLN COUNTY—H. C. Harris et al, se 14-27n-117e, dr bel 1550 ft.

NATRONA COUNTY—Mutual Oil Synd., Midway 2, sw se 14-36-79, hf oil, dd after co 6065 ft. Summit Oil Co., Trevett 1, 21-33-80, dr around 1538 ft.

SWEETWATER COUNTY—Vermillion Oil Co., sw se 15-12n-99w, mvg in to resume 4685 ft.

UINTA COUNTY—Transwestern Pete Co., Ltd., (Doheny) 5-14n-118, dd, gas show 4800 ft. Park City O&G Co., ne nw 16-15n-118w, resem for w.s.o. 2968 ft. Bear River Oil Co., Ltd., ne se 13-15n-120w, gas show reported 1000 ft.

WASHAKIE COUNTY—Bales Oil Trust, Brome 1, ne nw 13-48n-90w, test 1430 ft.

WESTON COUNTY—Julius Peters et al, Weitzell 1, nw 30-46-64, shot sand 4494-4515 ft, td 4590 ft. Gose Synd., ne 28-37n-63w, some oil showing 5050 ft. Voorhees et al, se sw 26-48n-64, ready to spud.

NEW MEXICO

Completions

Company, Well and Location	Initial Production Bbls.	Depth
SAN MIGUEL COUNTY (Cherryvale Structure)—		
Con-O-Kul Oil Co., Stephenson 1, ne 34-17-21	*	973
VALENCIA COUNTY—		
Western Natural Resources 1, 15-2n-5w	*	1770

New Operations

SANTA FE COUNTY—Kelsey Clients Development Estate 1, 26-10n-10e.

Wildcat Drilling Report

BERNALLILLO COUNTY—Norrins Realty, Pajarito Grant 1, 22-9n-1e, prep to run 10-in 3559 ft. Norrins Realty, Galegas Grant 1, 19-11n-4e, rigging up.

CHAVES COUNTY—R. D. Compton, sw se 20-10s-24, ur 8-inch at 899 ft. Warman Oil Trust, Weldon & Hoar, 1, se 9-14s-25e, dr water well.

DE BACA COUNTY — Montgomery et al, Wood 1, sw 6-4n-20e, fsh tools 4662 ft. Landowners Oil Co., State 1, ne 16-1s-27e, dr 5109 ft.

DONA ANA COUNTY—Middle States O&G Co., Boretzi 1, 14-36-5e, rig. Viking O&G Co., Cox 1, sw nw 26-25-5e, dr bel 250 ft.

GUADALUPE COUNTY—N. M. Prod. & Ref. Co., McMillan 1, 24-5n-16e, wait for orders 4507 ft. N. M. Explor. Co., Ltd., Anton Chico Grant 1, sw 20-9n-17, spudded.

RIO ARRIBA COUNTY—Governador Oil Co., 1, se 14-29n-7w, sd 2642 ft. Pan State Oil Co., 26-3s-1e, lcn.

ROOSEVELT COUNTY — Peterson et al, Good 1, se ne 32-5s-30e, rig up.

SAN MIGUEL COUNTY—Cabra Springs O&G Co., Thompson 2, ne 22-12-22, lcn.

SANTA FE COUNTY—Kelsey Clients Development Estate 1, 26-10n-10e, dr 825 ft.

SOCORRO COUNTY—J. C. Green et al, 1, 14-2n-5w, dr to be resumed, 300 ft.

VALENCIA COUNTY — Homer C. Mills, Inc., Tome 1, nw sw 29-6n-3e, spudded.

COLORADO

Wildcat Drilling Report

ADAMS COUNTY—Hills Dome Lease Dev. Co., se 27-3s-68w, mvg in new materials to resume, 3978 ft.

ARAPAHOE COUNTY—McDeb Drlg. Co., Fitzsimons 1, ne 7-4s-68w, stand 6110 ft.

DELTA COUNTY — Black Canyon O&G Co., Lot 12, 5-15s-94, install larger rig 330 ft.

ELBERT COUNTY—J. M. Botts, se 7-8n-58w, dr bel 4000 ft.

EL PASO COUNTY—Gulf States Oil Corp., Carson 2, ne 10-16s-66w, dr out plug 2000 ft.

GRAND COUNTY—Oil & Mineral Lands, Inc., McElroy 1, se sw 14-2n-81, resume at 618 ft.

LA PLATA COUNTY—McGarr Pete Co.'s Pinon Mesa 1, ne 34-33n-12, rig up. Phipps et al, sw 9-33-1e, sd 520 ft.

LAS ANIMAS COUNTY — P. W. Harr, Schneider 1, sw se se 10-33s-63w, dr 231 ft. P. W. Harr, Barela 1, nw ne 33-33s-62w, dr 1038 ft.

LINCOLN COUNTY — Eastern Colo. Oil Corp., State 1, nw 36-14s-57w, hf water from Muddy 3465 ft.

MOFFAT COUNTY—W. A. Myers et al, sw sw 16-4n-101w, dr bel 3250 ft.

MONTROSE COUNTY—Uncompahgre O. & G. Co., Vandemark 2, 27-50n-10, co to resume 800 ft.

PARK COUNTY — South Park O&G Co., Milligan 1, se 13-8s-76w, stand 3020 ft. South Park O&G Co., Esche 1, ne 5-9s-76w, fsh pipe 2470 ft.

WELD COUNTY — Tulsa-Ft. Morgan Oil Co., Anthes 1, ne ne 24-8n-59w, to install rotary 3318 ft. Ohio Oil Co., Butters 1, 7-6n-60w, testing 6718 ft. Manning & Terry, Miles 1, ne ne 13-6n-61w, sd for orders 6728 ft. Ramsey Pete Co., Tighe 1, sw ne se 15-7n-59w, dr 5250 ft. Retter Oil Co., Cronin 1, sw 24-1n-66, standing 625 ft.

Southeastern States

Installing Gas Lift On Mississippi Oil Producer

Jackson, Miss.—Henslee and associates have secured permission from the Mississippi State Oil and Gas Board to use gas to lift the fluid in Warner 1, Section 14-5-1e, Rankin County, which flowed oil recently, estimated at 500 barrels of 13 gravity, daily, along with about 3000 barrels of salt water. The well has recently been shut in awaiting disposal of the production and oil already in pits has been used to drill a wildcat south of Jackson. About 350 barrels has been used for fuel and it is estimated by the owners there is about the same amount still in the pits.

The operators are now running 600 feet of 1¼-inch tubing. To avoid any possible litigation that might arise in the event of possible damage from salt water when the well is opened, waivers for possible damage are being secured from adjoining lease owners.

One Gas Completion, One Location for Mississippi

Jackson, Miss.—Mississippi added one gas producer, a small one on the north edge of the Jackson field, in Hinds County, during the past week, and accounted for one wildcat location, the latter being in Lamar County, in Southern Mississippi.

The new gasser is Hope Oil & Gas Company's Crane-Lawrence 1, SW NE SE Section 23-6n-1e, estimated at eight million cubic feet of gas daily at 2496 feet; the Midway chalk was logged at 2485 feet.

In Lamar County, Dr. Charles Gorr and associates made location for Jordan 1, SE NW SW Section 1-2n-15w. This is on acreage originally in the block of Stauffer & Kouri, Trustees, who are drilling in Section 18-2n-14w, of the same county and are below 300 feet in Bond 1.

Mississippi Board Issues Rules Governing Drilling

Jackson, Miss.—The State Oil and Gas Board of Mississippi has issued rules regulating drilling of wells which call for applications for permits, the keeping of well logs, state supervision of casing setting and plugging for abandonment. These rules, moreover, specify mechanical requirements for different types of casing in the Jackson gas field and define the powers of representatives of the board.

Southeastern States Field Developments

MISSISSIPPI

Completions

Company, Well and Location	Initial Production Bbls.	Depth
HINDS COUNTY (Jackson)—		
Hope Oil & Gas Co., Crane-Lawrence 1, 23-6n-1e	¶8	2496

New Operations

LAMAR COUNTY—Dr. Charles Gorr et al, Jordan 1, nw sw 1-2n-15w.

Wildcat Drilling Report

(Wells shut down not included)

AMITE COUNTY — Magnolia State O&G Co., Chas. Anderson 1, ne nw 14-3n-3e, cemtd 12½ cas 121 ft.

CHICKASAW COUNTY — Hightower & Golson, Fleming 1, 20-13s-3e, (owdd) co , td 1605 ft.

HINDS COUNTY—Love & Lancaster, Elton Plantation 1, se se 17-4n-1e, 12½ cas 255 ft, sd 1200 ft for fuel.

LAMAR COUNTY—Stauffer & Kouri, Trs., Bond 1, se ne 18-2n-14w, sr, td 3011 ft.

NEWTON COUNTY — Dalton Dev. Co.,

Majure 1, se se 26-6n-11e, trying to stop caving hole, td 2000 ft.

ALABAMA

LAMAR COUNTY (Vernon)—P. J. McAlpine et al, Gardner 1, nw nw 22-15s-17w, wash to bot, td 3184 ft.

MOBILE COUNTY—J. C. Prine et al, M. & O. Ry. 1, se ne sw 33-2n-4w, dr 3035 ft, Wilcox.

WASHINGTON COUNTY — South Ala. O&G Co., St. Stephens A-1, 26-7n-1w, 12½ cas 78 ft, dr sandy shale 1100 ft.

MICHIGAN FIELDS

Spotted Production Not Stopping Central Michigan

Mt. Pleasant, Mich.—Despite a spotty producing structure from the Dundee limestone at approximately 3550 feet in the east border district of the Central Michigan pool as indicated by recent developments, holders of acreage in that vicinity are going ahead with a number of new tests making, it the most active development center in Michigan.

Of five wells completed in the border pool during the past week only one made a natural flow, three others have free oil in the holes and the fifth is dry.

The border pool comprises Sections 11, 12, 13 and 14, of Greendale township, Midland County, being an eastward extension of the main pool of Central Michigan. Two of the wells drilled in the area had initials of better than 1000 barrels but recent developments have been less promising.

Edward Stewart et al's Opperman 2 and Opperman 3, Section 12, each offset producing wells but neither of the tests made a commercial well. Opperman 2 probably will be abandoned, having gone into salt water while Opperman 3 made a good show of oil and is being treated with acid in an attempt to make it a commercial well.

Michigan Gas & Oil Company's Bond 2, SE SE NE Section 12, one location east of the No. 1 well on the lease which made 450 barrels on initial, was completed for about 75 barrels.

Gordon Oil Company's Talker 2, Lee township, NW SW SW Section 7, is being swabbed in the Dundee and W. L. McClanahan, Inc's Speerbecker 1, Greendale township, SW SW NW Section 13, showed 1500 feet of oil in the hole at 3560 feet but did not flow and is being treated with acid.

Despite the light showings of the recent tests this district continues to hold the chief attention of developers. Five new locations have been made in the area during the past 10 days and several others are planned.

Pure Oil Company completed the Purtell 5, Greendale township, NW NE SW Section 15, for 400 barrels a day while in the same township, NW NE Section 16, Gordon Oil Company completed the Skinner 5B for 175 barrels for the two best completions during the week.

Smith Petroleum Company has abandoned Studor 1, Saginaw County, Fremont township, Section 14, at 1000 feet, deciding that the Red Rock formation was too low to indicate a lower producing formation.

In Oceana County several tests are expected to get under way in the next few weeks. Two tests are being sunk in the county and locations are being cleared in the vicinity of Duvall-Weirich 1, Elbridge township, which recently was completed in the Traverse formation for about 100 barrels a day. This well, a wildcat, is shut in because of litigation over the title.

Central Michigan Well Fire Kills One, Injures Four

Mt. Pleasant, Mich.—Five persons were burned, one fatally, in an oil well fire Saturday evening, September 24, at Pure Oil Company's Reed 2, Midland County, Greendale township, Section 10, in the heart of the Central Michigan pool.

Walter Miller, 28, died in a hospital here six hours after the fire from burns. Four others, Mark Lemon, 45; Bland Parker, 28; Edward Stone, 30, and George Jochus, 33, are in a hospital suffering from serious burns. They are expected to recover. All of the injured men were employes of Pure Oil Company and members of a tubing crew. They formerly lived in West Virginia.

The fire broke out at 6:30 p.m., Saturday when the crew was tubing the well preparatory to putting it on a pump. A spark from the engine is believed to have ignited gas that fired oil flowing from the well. Miller was trapped in the derrick house and the others were sprayed with burning oil and further burned in rescuing Miller.

Pure Oil Company's Reed 2, Midland County, Michigan, was ignited while tubing was being run. Five men were badly burned and one of them died.

The fire was not quelled until 18 hours after it started. The 82-foot steel derrick was weakened by the fire so that it crumpled to the ground and other well equipment was destroyed. Damage was estimated at about $6,000.

It was the second oil well fire resulting fatally since the Central Michigan pool was opened up four years ago. In July, 1931, Walter L. McClanahan's Struble 1, located in the same section as the Reed 2, was fired resulting in 10 deaths.

Application Filed for Nine Mile Two-Inch Gas Line

Mt. Pleasant, Mich.—Omar P. Stelle of Chicago has made application to the State Public Utilities Commission of Michigan for permission to build a pipe line from the Vernon (Isabella County) gas field to the city of Coleman, Michigan, about 9½ miles. The line would be of two-inch construction.

The Coleman city council has approved a franchise but it must go before the people in the November elections for a popular vote for a final decision.

The utilities commission as yet has taken no action on the application.

Michigan Field Developments

Completions

Company, Well and Location	Initial Production Bbls.	Depth
GRATIOT COUNTY—		
Miller & Coombs, Askergrad 2	*	....
MIDLAND COUNTY—		
Pure Oil Co., Purtell 3	950	....
Purtell 5, Greendale Twp., nw ne sw Sec. 15	400	3571
William A. Robinson, Skinner 2....	1900	3540
Gordon Oil Co., Skinner 5-B, Greendale Twp., nw ne Sec. 16	175	3573
Edward Stewart et al, Opperman 2, Greendale Twp., se ne se Sec. 12..	*	3555
SAGINAW COUNTY—		
Smith Pet. Co., Studor 1, Fremont Twp., Sec. 14	*	1000

New Operations

MIDLAND COUNTY—Walter L. McClanahan, Inc., Struble 7, Greendale Twp., ne ne sw Sec. 10. Walter L. McClanahan, Inc., Root 2, Greendale Twp., ne ne sw Sec. 12.

OCEANA COUNTY—A. S. Cochran, Hannum 1, Elbridge Twp., sw ne Sec. 31.

Wildcat Drilling Report

(Wells shut down not included)

MIDLAND COUNTY—Pure Oil Co., Yost et al 1, Greendale Twp., Sec. 35, dr 1100 ft. Theodore Oil Co., McBain 1, Greendale Twp., Sec. 1, sp. Pacific Oil and Gas Co., Hoyt 1, Jasper Twp., Sec. 24, dr 3000 ft.

CLARE COUNTY — Theodore Oil Co.,

Thompson Brothers 1, Greenwood Twp., Sec. 35, ur in Marshall, 1890 ft.

OCEANA COUNTY — Varner and Lockwood, Flood 1, Pentwater Twp., Sec. 34, dr 500 ft. L. E. DuVall, Walace 1, Elbridge Twp., dr 250 ft.

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EASTERN STATES

Field Developments

Completions

PENNSYLVANIA

Company, Well and Location	Initial Production Bbls.	Depth
BEAVER COUNTY—		
R. B. Abrams, Montgomery 2	*	....
SOUTHEASTERN OHIO		
MONROE COUNTY—		
J. W. McCree & Co., McCree Hrs. 1	¶¼	1905
WASHINGTON COUNTY—		
Clyde Campell, Depuy 6	*	1658
J. A. Herlan & Co., McKitrick 1	2	1382
CENTRAL OHIO		
COSHOCTON COUNTY—		
Murphy & Co., Rine 1	110	3043
GUERNSEY COUNTY—		
William Blackstone, Secrest 1	*	3669
MEDINA COUNTY—		
Ohio Fuel Gas Co., Schnable 1	¶¼	....
MUSKINGUM COUNTY—		
Hopewell Gas & Fuel Co., Weaver 3	*	4204
MEIGS COUNTY—		
Thomas & Co., Hysell 3	¶¼	1073
PERRY COUNTY—		
N. L. Altire, Lemity 12	4	1095
Huntington National Bank, Rogers Bros. 25	12	1117
STARK COUNTY—		
Ohio Fuel Gas Co., Stolincy 1	¶½	....
TUSCARAWAS COUNTY—		
Oxford Oil & Gas Co., Shearer 1	50	3712
TRUMBULL COUNTY—		
Wittmer Oil & Gas Co., Strock 1	*	4173
VINTON COUNTY—		
Raccoon Oil & Gas Co., Stout 2	*	1040
WAYNE COUNTY—		
David Shafer, Jontes 1	*	3375
NORTHWESTERN OHIO		
SENECA COUNTY—		
Murphy & Sons, Bihn 2	25	1517
Sandusky Gas Co., Martin 1	¶¼	1500
Tiffin Industrial Gas Co., Snyder 1	¶½	1532
VAN WERT COUNTY—		
Anderson & Co., Bowers 1	¶¼	1271
WYANDOT COUNTY—		
Upper Sandusky Gas Co., Hildebrand 1	¶¼	....
INDIANA		
PIKE COUNTY—		
Claude E. Noble & Co., Arnold 1	¶1	1046
Indiana Southwestern Gas Corp., Shawhan 1	*	1550
KENTUCKY		
DAVIESS COUNTY—		
Cumberland Petroleum Co., Irie 3	90	640
Johnson Oil & Refg. Co., Jenkins Estate 1	117	924
Mida McMahan, Jones 8	75	632
Hupp, French & Co., Mills 1	*	810
C. E. Daugherty, Hallpausch 4	15	....
S. M. Sherman, Pegrom 2	*	....
HART COUNTY—		
Mud Lick Oil & Gas Co., Gibson 1	30	....
HANCOCK COUNTY—		
Kencel Oil Co., McGarvin 9	20	....
D. T. Bolling, School House lot 1	20	....
H. C. Smith, Stout 6	15	....
McLEAN COUNTY—		
Cameron & Thompson, Kerrick 1	10	1380
Thelma Meng Co., Atherton 5	8	....
OHIO COUNTY—		
D. T. Bolling, Frand Hand 3	25	....
Goldberg & Co., Rusher 1	15	....
L. C. Young, Allen 2	35	....
Allen 3	40	....
Creek Drilling Co., Smith 3	80	....
Morris 6	25	....
Morris 7	20	....
Hupp & Duff, Wright 3	15	....
John Lyle, Whitehouse 4	*	....

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1. Mechanical-Drive Turbine

GENERAL ELECTRIC COMPANY

General Electric Company, Schenectady, New York, announces a new mechanical-drive, non-condensing steam turbine for driving centrifugal pumps, fans, and other rotating equipment, suitable for driving equipment at speeds from 1200 to 4000 revolutions per minute and available up to 250 horsepower under suitable steam conditions.

The new turbine is a single-stage machine with two rows of revolving buckets. The wheel casing is split horizontally to allow easy access to the internal parts, and the steam and exhaust pipes are connected to the lower half of the machine. A centrifugal governor, with weights pivoting on knife edges, operates with little friction and provides proper speed regulation. An independent emergency governor is included.

The new turbine bears the type designation D-59.

2. Refractory Cement

QUIGLEY COMPANY, INCORPORATED

Quigley Company, Incorporated, 56 West 45th Street, New York, New York, announces "Cast-Refract," a new type of refractory with great flexibility of application which the manufacturer claims can be cast or moulded on the job, and which air-sets quickly with high structural strength so that it can be put under full heat within 24 hours.

3. Trucks

THE FOUR WHEEL DRIVE AUTO COMPANY

The Four Wheel Drive Auto Company, Clintonville, Wisconsin, has announced a complete new line of heavy-duty trucks for 1933. The models range in size from the 2 to 2½-ton four-wheel-drive to the 15-ton six-wheel drive, and incorporate many new improvements.

Special mention is made of three primary models, featured for use in the major FWD markets; they are the H6 of 2-2½ tons capacity, the CU6 of 3½-4 tons capacity, and the X6. Each of these trucks incorporates the basic four-wheel-drive principle of propulsion and such refinements as are applicable to their field of use.

The X6 model of 6 to 10 tons capacity is a four-wheel-drive six-wheeler, designed especially for the heavy hauls encountered in oil service. Radically different from the conventional four-wheel-drive six-wheelers, this unit is powered on the front and first rear axle. The extreme rear axle is a load-carrying member only. This permits the use of the regular center differential between the driving axles, to compensate for the variations in wheel travel when turning corners or traveling over rough roads. Power is supplied by a 110 horsepower six-cylinder engine of 517 cubic inch displacement which is featured as being very economical to operate. According to the manufacturers, the new manifold design, combined with the patented high-turbulence head, is responsible for the increased power and economy of operation.

Service brakes are air-operated by individual diaphragms on each one of the six wheels, these diaphragms being mounted directly on the backing plates. The brake shoes are 4 inches in width and act on 17¼-inch drums, bringing 912 square inches of braking surface into play with a slight pressure on the foot pedal. The emergency brake acts on four wheels through the driving mechanism from a 7 x 11½ drum located just behind the transfer case.

— — — — — — *MAIL COUPON* — — — — — —

THE OIL WEEKLY,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos._____ described in the October 3, 1932, issue of THE OIL WEEKLY.

Name . . . . . .

Company . . . . . .

Address . . . . . .

Book on Russia

"An American Engineer Looks at Russia," by Col. George A. Burrell, (The Stratford Company, Boston, Mass., $2.50) is an intensely interesting story of the conditions in Russia before and since the World War. Col. Burrell spent 18 months in Russia modernizing part of that country's petroleum industry.

In this book which convincingly covers the subject, the author gives first hand reports of Communism, with its hold on 165,000,000 Russian inhabitants; authentic reports of the dreaded espionage; poor housing facilities, lack of materials of every sort, government cooperative stores, influence of the trade unions, collectivization of the peasant farms; what the Communistic Party is slowly accomplishing through education of a people once ignorant and illiterate; Stalin's rise to power after escaping from prison many times. The Five Year Plan of Soviet Russia is explained and exposed in all its intricate maneuverings. The present status of Soviet Russia, how it is affecting the rest of the world, and the menace of Communism in the United States, summarizes this book of plain and enlightening facts.

Col. Burrell neither went to Russia nor came out, a Bolshevist, and feels that matters are not all bad, or all good. In this book he endeavors to present the situation fairly and without prejudice.

Rock Drills

Ingersoll-Rand Company, 11 Broadway, New York, New York, announces availability of "Rock Drills and Sharpeners," a 32-page, illustrated, condensed catalogue which consolidates in one volume essential information concerning equipment for drilling rock and for reconditioning drill steels. In addition to describing the various rock drills, including core drills, the booklet covers all accessory equipment and also contains instructions for correctly heat treating drill steels.

Squeaks *from the* BULL WHEEL

With bowed shoulders Homer Smith entered his house. His dragging feet scuffed their way through the front hall and into the kitchen, where his wife was preparing the evening meal.

The smile faded from Mrs. Smith's face as she noted the wobegone appearance of her better half.

"Homer," she cried.

Slumping into a chair, Homer Smith stared straight ahead with dead eyes.

"Tell me, darling," pleaded his wife.

She came over to Homer and lifted his chin in her hand. Homer Smith moistened his lips with his tongue.

"The worst," he said dismally, "has happened."

"No," cried Mrs. Smith, aghast.

"Yes," said Homer. "This afternoon, just before quitting time, the boss called me in and gave me the business."

Landlady (discussing the world's troubles)—I suppose we must be prepared for anything these days.

Boarder (eyeing his helping)—Yes—er—or at any rate, for hardly anything.

Employer—John, you were brought home drunk last night. How do people know where you live?

Butler—I always carry some of your visiting cards with me, sir.

It was along a beautiful stretch of highway, and the telephone line along the way was in the hands of repair men. She was driving and cooing, when of a sudden she spied the men climbing the telephone poles. "Elmer, just look at those fools," she exclaimed; "do they think I never drove a car before?"

Fair One—I suppose you visit England to satisfy your thirst for travel?

American—No; just for my thirst.

Smith—My wife sure is thrifty. She made me a necktie out of an old dress of hers.

Jones—That's nothing. My wife made her a dress out of one of my ties.

"I never knew until I got a car," said the vicar, "that profanity was so prevalent."

"Why, do you hear so much of it on the road, sir?" asked the parishioiner

"Dear me, yes," replied the vicar. "Nearly every one I bump into swears dreadfully."

Gruff Editor (to applicant): "Know how to run a newspaper?"

Applicant: "No."

G. Ed.: "What! A man with your vast experience out of a job?"

(P.S. He g. t. j.)

"Biggs," said Big Hearted Sam, lighting a Corona-Corona, and tilting back in his massive chair, "you have been in our employment 40 years today. To mark our appreciation of your length of service and unswerving loyalty—you will henceforth be addressed as "Mr. Biggs."

College Boy (walking): "Gimme a gallon of gas."

Garage Man (snappishly): "Well, where's your can?"

College Boy (sadly): "About a mile down the road."

"You're scared to fight."

"I ain't; but me mother'll lick me."

"An' how'll she know?"

"She'll see the doctor goin' to your house."

Mable: "Why so sad, Agnes?"

Agnes: "Oh, it's just terrible; that big sap I was going to sue for breach of promise wants to marry me now."

"So your friend became wealthy through a sudden movement in oil. What oil stock did he buy?"

"He didn't buy any. A rich old aunt tried to start a fire with a can of it."

Bobby: "Daddy! A boy at school told me that I looked just like you!"

The Dad: "That so? And what did you say?"

Bobby: "Nothin'. He was bigger'n me."

Rastus: Boy, when I kisses mah wife she jes closes her eyes ez tight!

Sambo (with enthusiasm): I'll say she do!

Rastus: What did you say?

Sambo (with much less enthusiasm): I say, *do* she?

"Ah, Watson," commented the prospective Sherlock, sipping his whiskey and soda, "I see you have changed your underwear."

"Marvelous, Holmes . . . but how'd you know?"

"Well, Watson, you've forgotten to put your trousers on."

What Price Floating Equipment?

There is no insurance against the hazards in landing and cementing a string of casing, except *your own care* in the selection of equipment and constant supervision.

It isn't so much the trifle it costs to use Baker Cement Guiding, Floating and Cementing Equipment, as it is what it costs *not to use* Baker Equipment.

A Baker Cement Float Shoe will not fail to make up on your casing.

It will not fail to land your casing, no matter how long or heavy it may be.

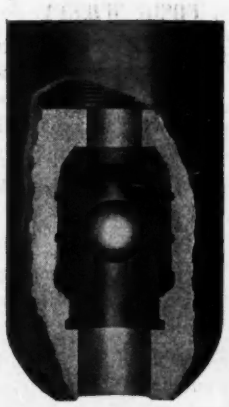
The Bakelite ball valve will not fail to seat instantly and perfectly against the rubber seat after cementing.

The concrete and Bakelite plug and valve assembly *will not prevent* the taking of a core below the shoe.

The inner *non-metallic* construction will not delay drilling progress.

It will not increase bit expense.

In short, it is *what it costs NOT TO USE* Baker Cement Equipment that determines its value.



Cutaway picture of Baker Cement Float Shoe, showing internal concrete and Bakelite valve construction used in all Baker Cement (Floating) Equipment.

BAKER OIL TOOLS, Inc.

Huntington Park, California

COALINGA HOUSTON TULSA NEW YORK

LETTERS to the Editor

Persistent repeated rumors of a proposed price slash of crude oil challenge every right thinking man in Texas, Oklahoma and Kansas to move to avert such a catastrophe which will not only break down proration with consequent destruction of a great natural resource but will plunge a great cross section of people in these three states back into the ecomonic pit of despair from which we are slowly emerging. Therefore, I extend to you and 99 other leaders of industry and finance in the oil sections of Oklahoma, Kansas and Texas an earnest invitation to be my guest at a dinner to be given in Tyler, Texas, Tuesday evening, September 27, at the Blackstone Hotel at 7:15 o'clock.

This meeting will take the form of a southwestern oil price structure conference, at which problems affecting our mutual welfare will be fully and frankly discussed.

Proceedings at this gathering will be broadcast by remote control over radio stations in Dallas and Shreveport.

Please advise me by wire if possible that you will attend, to the end that you may not only honor us with your presence but assist in rendering a patriotic service to the great oil industry in our respective sections.

CARL L. ESTES,
Publisher Tyler Courier-Times, Tyler Morning Telegraph, Tyler Texas.

Your telegraphic invitation to be present at the dinner which you are giving tomorrow evening is very much appreciated and I deeply regret that I shall be unable to attend.

Naturally THE OIL WEEKLY is very much interested in seeing the market structure within the oil industry hold and improve in tone.

It is our belief, however, that there will be no reduction in the price of Mid-Continent crude unless proration breaks down. If proration breaks down I do not believe that anything can avert a drastic cut in the price of oil.

In fact the very rumor that you refer to is founded on the fact that proration in East Texas has not stopped a flood of oil produced in defiance of proration orders.

Mr. Dudley, publisher of THE OIL WEEKLY, has just returned from an extended trip through the Middle West where he finds that the gasoline market is extremely soft and investigation indicates that the market is weak because a material amount of oil in East Texas is being produced in violation of proration orders and sold at prices considerably under the market.

We wish you well in your efforts—we are for any constructive effort. We would suggest, however, that when you think of drastic reductions in the price of crude oil that you remember that a number of producers in East Texas have voluntarily sought drastic reductions in the price of crude oil by offering oil at less than the posted price.

Except for East Texas the oil situation does not look bad at all. Whether or not East Texas will stay in line depends at this present moment on not so much what the leaders within the oil industry can do but on the forthcoming decision of the three-judge federal court at Houston. That this court may do away with proration is certainly within the realms of possibility because unfortunately that court did not have up for trial the great question of the welfare of all of East Texas but had only certain questions of law to decide.

If East Texas is plunged into the turmoil which 10 or 15 cent oil will bring on the heels of unrestricted production; if citizens who are entitled to benefits accruing from Texas' most valuable resource are deprived of those benefits and see the cup of plenty dashed from their lips; if the State of Texas suffers at an inopportune time another great drop in its tax income, and if what should have been the greatest blessing possible for East Texas proves to be its greatest curse, then we cannot blame our three judges but must blame a condition under which their hands are tied and under which they must think of the few rather than the many.

W. W. Foster, president of Hill & Foster Company, Wichita Falls, Texas, announces appointment of Houston Oil Field Material Company as exclusive distributors on the Foster Folorod, covering East Texas, South Texas, Southwest Texas and South Louisiana.

General Electric Company announces effective September 30 the appointment of C. W. Fick as district engineer at Cleveland, Ohio, succeeding William S. Culver, who retires on the same date after 47 years of service with the company.

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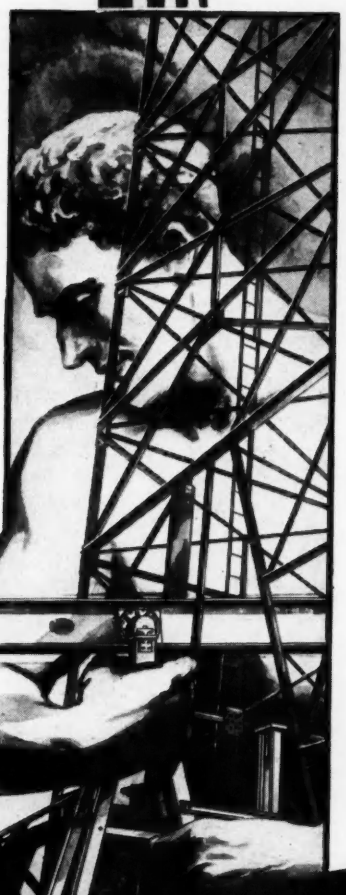
Practical - Profitable



PARKERSBURG Rig Fronts are correctly designed so that proper balancing eliminates excess vibration, resulting in smooth, even strokes for more effective operation under all pumping conditions.

Proper counterbalancing; efficient distribution of strength in the Walking Beam and modern center trunnion principle for practically vertical stroke; Sampson Post of latest tripod design, riveted and welded for maximum rigidity; Pitman Stem of sturdy H-beam section—the entire assembly is constructed from sound engineering experience for securing continuous, profitable production.

Ask for complete details of the rig to suit your requirements.

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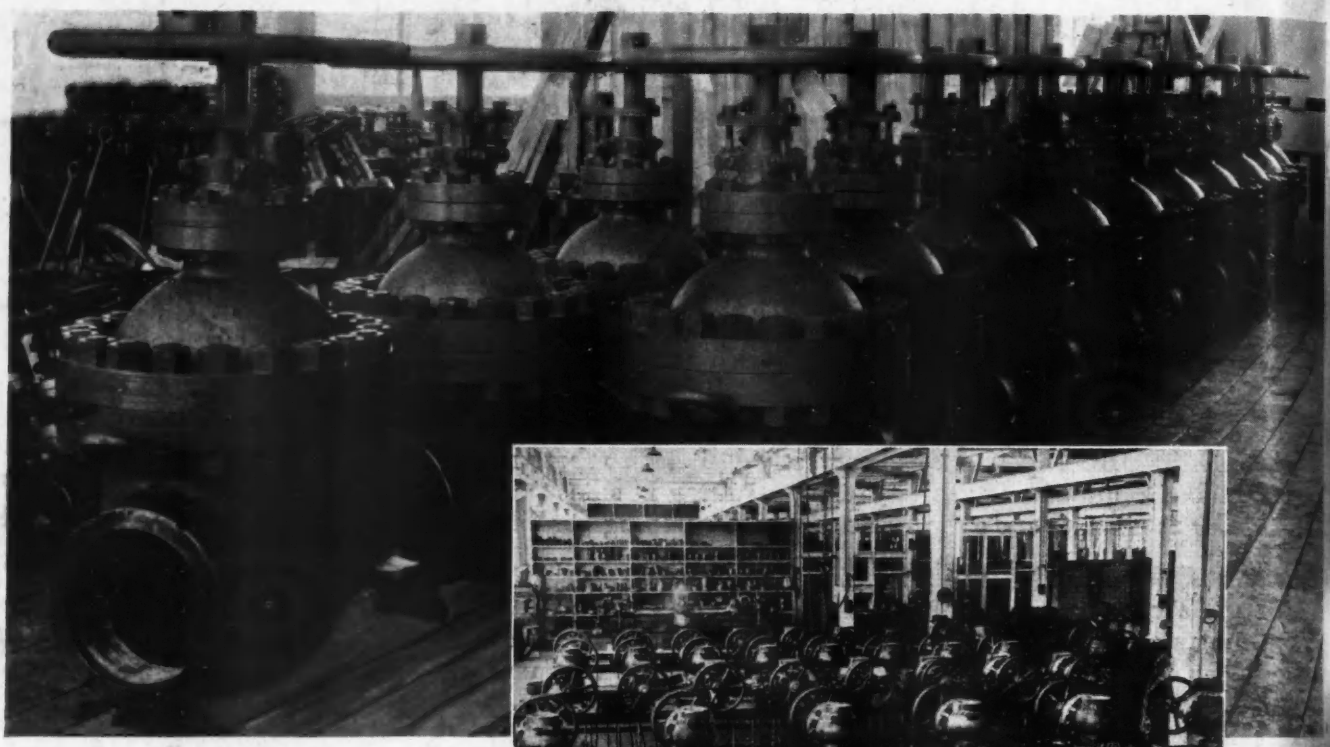

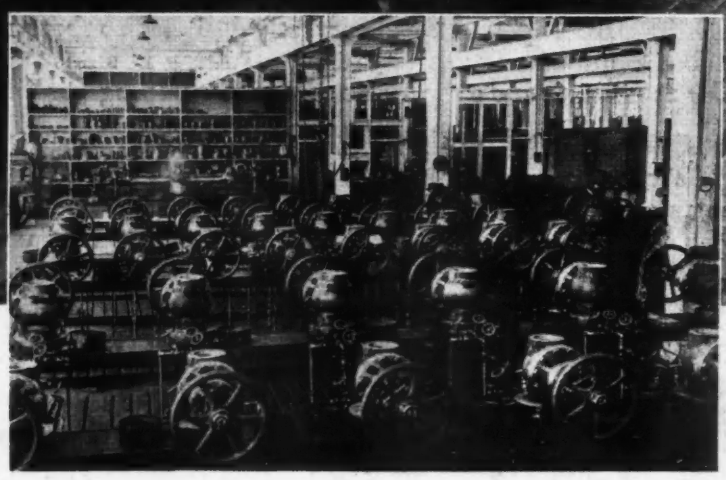

*Inset picture shows partial view of the testing department at the main plant of Hughes Tool Company.

Every HUGHES VALVE

. . . is tested to TWICE its desired WORKING PRESSURE

Drilling Valves play an important part in the bringing in of high pressure wells. That proper control may be *assured*, no valve should be used that has not been thoroughly tested.

When completed every Hughes Valve is tested with kerosene at double the rated working pressure, during which period shock tests are also made. Subsequently the gate is opened under pressure and a final test with air at 100 pounds is made to check the seating of the wedge. This test insures positive closure under varying working conditions. Approximately 24 hours are required to test each Hughes Valve.

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